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COMMONWEALTH OF MASSACHUSETTS

EXECUTIVE OFFICE OF ENERGY RESOURCES

04

ANNUAL REPORT FOR CALENDAR YEAR 1989

SUBMITTED TO THE
JOINT COMMITTEE ON ENERGY
HOUSE COMMITTEE ON WAYS AND MEANS
SENATE COMMITTEE ON WAYS AND MEANS

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I. INTRODUCTION

I. INTRODUCTION

A. BACKGROUND

Energy is a basic human need. Every citizen in the Commonwealth of Massachusetts needs access to this important commodity just like they need food, shelter, and clothing. Without reliable and affordable energy, people can not turn on the lights in their homes or offices, heat their homes, cook food for their families, take showers, watch their favorite television programs or drive their cars.

Yet despite its importance, energy policy is often an afterthought for the public and its government. This has particularly been the case on the national level over the last eight years.

On the state level, however, the importance of energy and energy policy has not gone unnoticed, perhaps because of the memories that are still in the public consciousness from a decade ago.

In 1973, the people of Massachusetts were made painfully aware that their access to affordable energy could be immediately and profoundly affected by events around the world over which they had no control. Massachusetts citizens were forced to realize not only the importance of energy supply to their daily existence, but also the financial hardship that rising energy costs could inflict upon them and their families. Many Massachusetts citizens of low and moderate income were suddenly faced with the choice, in the winter months, of heating their homes or feeding their children. Businesses found their energy costs skyrocketing, and their profits decreasing. City, town, and state governments also found their budgets stretched as they tried to cope with rising costs to heat and light their schools and offices.

Recognizing the public problems that resulted from this energy crisis, Massachusetts state government acted. Building on the energy work that had been done in the Commonwealth from 1974 through 1978, the Commonwealth created in 1979 the Executive Office of Energy Resources (EOER). This cabinet-level agency was charged with designing and implementing programs that would achieve energy conservation and reduce the Commonwealth's reliance on expensive imported fuels. In addition, EOER was made responsible for setting the state's energy policy, maintaining up-to-date energy supply and demand information, and planning for energy emergencies.

B. THE NATIONAL ENERGY ENVIRONMENT OF THE 1980'S

In the last eight years the debate over the development of a national energy policy has become polarized. Despite the importance of energy in the lives of our citizens, we have all had to contend with a national Administration that places the development of non-nuclear energy sources at the bottom of its list of priorities. In 1981, newly-elected President Ronald Reagan stated that one of his goals was the abolition of the federal Department of Energy (DOE). Although the President experienced a change of heart on this issue, he dramatically affected the way that all state energy offices operate.

In the past eight years, federal funding for energy conservation and renewable energy development has been drastically reduced. Between FY81 and FY89, the Reagan Administration cut the federal budget for energy conservation by over sixty percent, and the budget for solar and other renewable energy programs by over eighty percent. At the same time, funding within DOE's budget for nuclear weapons has more than doubled, and now represents two-thirds of the total DOE budget.

Between FY81 and FY89, the Reagan Administration also attempted several times to zero-fund all of the major national energy conservation and renewable energy development programs. But while the Administration was not successful in this effort because of the Congress, they did eliminate individual federal tax credits for the installation of solar and other renewable energy systems and energy conservation measures. In addition, reduced energy conservation funding became a reality.

Developments in energy throughout the world have also directly affected the nation's energy picture in the 1980's. The instability of the Organization of Petroleum Exporting Countries (OPEC), which may have temporarily lost its hold on the world oil market, has obviously had an impact on U.S. consumers. This disarray has produced a worldwide oil glut resulting in lower and more stable petroleum prices and supplies throughout the United States. This oil glut, combined with the large amount of conservation that took place in the decade following the 1973 Arab Oil Embargo, has tempted the American public and the media to declare that the "energy crisis" is over.

But warning signs are beginning to reappear: the Iran-Iraq War is now over and OPEC is regaining stability. In addition, an alarming trend is developing. In 1988, U.S. production of crude oil fell to the lowest level since 1950, while foreign oil imports climbed to their highest level in nearly a decade.

Nationally, the public has begun to focus its attention on one important energy issue: the development and use of nuclear power. In 1979, a nuclear power plant at Three Mile Island in Pennsylvania came perilously close to a meltdown of its radioactive core. Then on April 26, 1986, in a small town in the Ukraine, the world witnessed its worst nuclear power plant accident, and ever since "Chernobyl" has been a household word. Chernobyl reminded all Americans of the risks that our nation has been taking with a policy that puts building power plants first and the issue of public safety second.

C. THE MASSACHUSETTS ENERGY ENVIRONMENT OF THE 1980'S

EOER's overall mission over the past six years has been to bring stability to energy supplies and prices in the Commonwealth. Due to its geographic location, climate, and lack of conventional energy resources, Massachusetts historically has been at a competitive disadvantage with respect to energy prices and supplies. Since location, climate, and lack of conventional fuels cannot be altered, in the 1980's, EOER has focused on minimizing the price and supply uncertainties which have plagued Massachusetts citizens since 1973.

Families and businesses struggling to maintain themselves and prosper in Massachusetts can cope more effectively with the known than with the unknown. While relatively high energy prices may be a chronic burden on our economy, rapidly fluctuating prices with acute price spikes are much more difficult to bear by families with low or fixed incomes or businesses with minimal profit margins.

Closely related to price stability is a secure supply of energy. Any short-term supply tightness in the energy market can precipitate a price spike. While Massachusetts has not had an actual fuel supply shortage since the natural gas supply interruption of 1981, EOER believes that low oil inventories can cause fuel oil price spikes. Similarly, low availability of electric generation due to poor performance or poor planning leads to the use of the most expensive, antiquated generators at peak demand periods, thereby increasing consumers' bills.

EOER's approach to the goals of maximizing supply and stabilizing price has been to focus principally on demand-side solutions, such as conservation, and to support supply-side solutions that allow other players into the market thereby increasing competition. EOER has adopted this orientation because: (1) the existing oil, gas, and electric industries are able to advance traditional supply-side ideas without substantial government assistance; (2) demand-side options will not advance adequately without government leadership and alteration of the market in the short-run; and (3) demand-side options are generally more cost-effective and environmentally benign than supply-side options as a means of achieving price and supply stability in a rapidly growing economy in the long run.

Since 1983, EOER has recognized that demand for energy in the Commonwealth will inevitably be met by a combination of supply-side and demand-side options. However, our public policy dedication to demand-side options has been necessary and appropriate given the orphan status of conservation as a source of energy supply in Massachusetts until recently.

D. EOER STATUTE

The Executive Office of Energy Resources was created by Chapter 796 of the Acts of 1979. EOER was established as a cabinet-level agency, within which there is an Office of the Secretary, a Department of Energy Resources, and the Energy Facilities Siting Council. The Secretary is the executive and administrative head of the Department of Energy Resources, and chairs the Energy Facilities Siting Council.

EOER was elevated to cabinet-level status in 1979 in order to provide a more coordinated focus to the Commonwealth's energy policies and programs. However, not all energy-related functions of state government were included in EOER. For example, the Department of Public Utilities retained supervision over setting rates and conditions of service for gas and electric utility companies, and the Executive Office of Communities and Development retained supervision of the fuel assistance and low-income weatherization programs. Both of these agencies have other mandates as well: the DPU also supervises the telecommunications industry, water companies, bus companies and commercial motor vehicles such as taxicabs and moving companies. EOCD's primary mandate is to provide low-income and aforable housing to the citizens of Massachusetts.

E. EOER MISSION, LONG TERM GOALS, AND GOALS AND OBJECTIVES FOR FY 1989

(1) Mission

The mission of the Executive Office of Energy Resources is to protect the Commonwealth and its citizens from energy shortages, economic dislocations and hardships by developing, by coordinating and by promoting a comprehensive energy program. This is accomplished by:

- o reducing the dependence of the Commonwealth and its citizens on costly imported and conventional energy sources;
- o promoting the development of alternative energy and energy conservation;
- o enhancing the economic development of alternative energy and energy conservation-related industries;

- encouraging the use of alternative and renewable energy sources which foster economic growth, while protecting the environment;

- encouraging and sustaining high administrative standards of the Executive Office through personal and professional excellence.

EOER's mission statement serves as the cornerstone of the agency and expresses the fundamental duties of the agency.

(2) Long-Term Goals

The long-term goals of EOER represent the infusion of its mission into the policies and programs of the Secretariat. These goals are:

- To perform and administer state and federally funded energy conservation efforts in the residential, commercial, industrial and transportation sectors to gain energy and cost savings.

- To aggressively promote energy conservation within the Commonwealth's public sector by developing energy improvements in public buildings, implementing the state facilities cogeneration study recommendations, improving agency bond programs operation and utilizing a computerized life cycle cost analysis.

- To encourage additional viable alternative energy resource systems in the public and private sectors.

- To develop clear and consistent energy policies in the Commonwealth through a coordinated approach to energy planning with other state and federal agencies.

- To improve the Commonwealth's ability to determine the best future energy supply options and to implement policies to ensure their development, including a regional electricity supply plan, an annual forecast and a comprehensive nuclear policy.

- To maintain energy data and information management capabilities to aid in energy planning and decision making.

- To direct the Massachusetts Photovoltaic Center to promote photovoltaics and the Commonwealth's photovoltaic industry.

- To increase public outreach efforts to achieve greater public awareness of the Commonwealth's energy issues, policies and programs.

- To encourage the development of economic and environmentally suitable power supplies in the Commonwealth.

- To manage the legal, financial and personnel resources needed to support all of the agency's programs and policy initiatives.

(3) Goals and Objectives for FY 1989

Each year, EOER establishes short-term agency goals; they provide a structure which allows EOER's policies and programs to work systematically toward larger long-term agency goals, and ultimately toward the goals outlined in the agency's mission statement. EOER's FY89 goals and objectives are:

- To promote and advocate for increased supply of natural gas to Massachusetts in FERC's "Open Season" process, and to work with Massachusetts' Congressional Delegation to urge FERC to expedite the review.

- To influence all new development in Massachusetts, to encourage it to be as energy efficient as is economic over the lifetime of the investment. In the public sector this includes the development and implementation of life cycle costing regulations for public buildings. In private development it includes encouraging the DPU and utilities to develop programs like "hook up fees" and other incentives; as well as implementing the new appliance efficiency law and the revised energy conservation standards of the state building code to encourage energy efficiency.

- To develop a public education strategy that emphasizes the progressive role of EOER in promoting conservation and alternative energy technologies, and to design an information package which emphasizes EOER's work products as future solutions in addressing our energy needs. Included in this design would be coordinating an overall methodology for evaluating energy savings from EOER's programs.

- To continue to improve the Commonwealth's energy planning, through efforts like the State Annual Forecast of Energy Resources (SAFER), EOER's involvement in the New England Governor's energy project; as well as the review and decision making roles of the Siting Council in articulating proper resource planning criteria on utility forecast and supply plans.

- To continue the intervention in DPU #86-36 (Generic Rule Making) proceedings in pursuit of a least-cost planning rule; and to actively participate in both phases of the collaborative program design process negotiated with the utilities.

F. EOER STRUCTURE

In January 1983, Michael S. Dukakis was sworn in to his second term as Governor of the Commonwealth of Massachusetts, and a major reorganization of the Executive Office of Energy Resources was begun.

When the reorganization was complete, EOER had been divided into four major sections: Policy, Program, Administration, and Legal. Also established were an Undersecretary, two Assistant Secretaries, and a General Counsel to head up these areas of the office, who report directly to the Secretary of Energy.

The Policy Division is charged with the formulation of energy policy for the Commonwealth to be implemented either directly by EOER or through other entities. The Program section of the office includes five divisions, each of which is responsible for the administration of specific energy programs. These divisions are: the Residential Conservation Division, the Residential Financing Division, the Commercial/Industrial Division, the Institutional Conservation Division, and the Technical Services Division.

The Administration section of the office includes the fiscal and personnel operations of EOER. The Legal office is in charge of all of the legal and legislative relation functions of EOER.

In addition, EOER has in its Secretariat one agency, the Energy Facilities Siting Council (EFSC), which is a regulatory agency funded by utility assessments. EOER also operates the Massachusetts Photovoltaic Center, which was founded in 1986.

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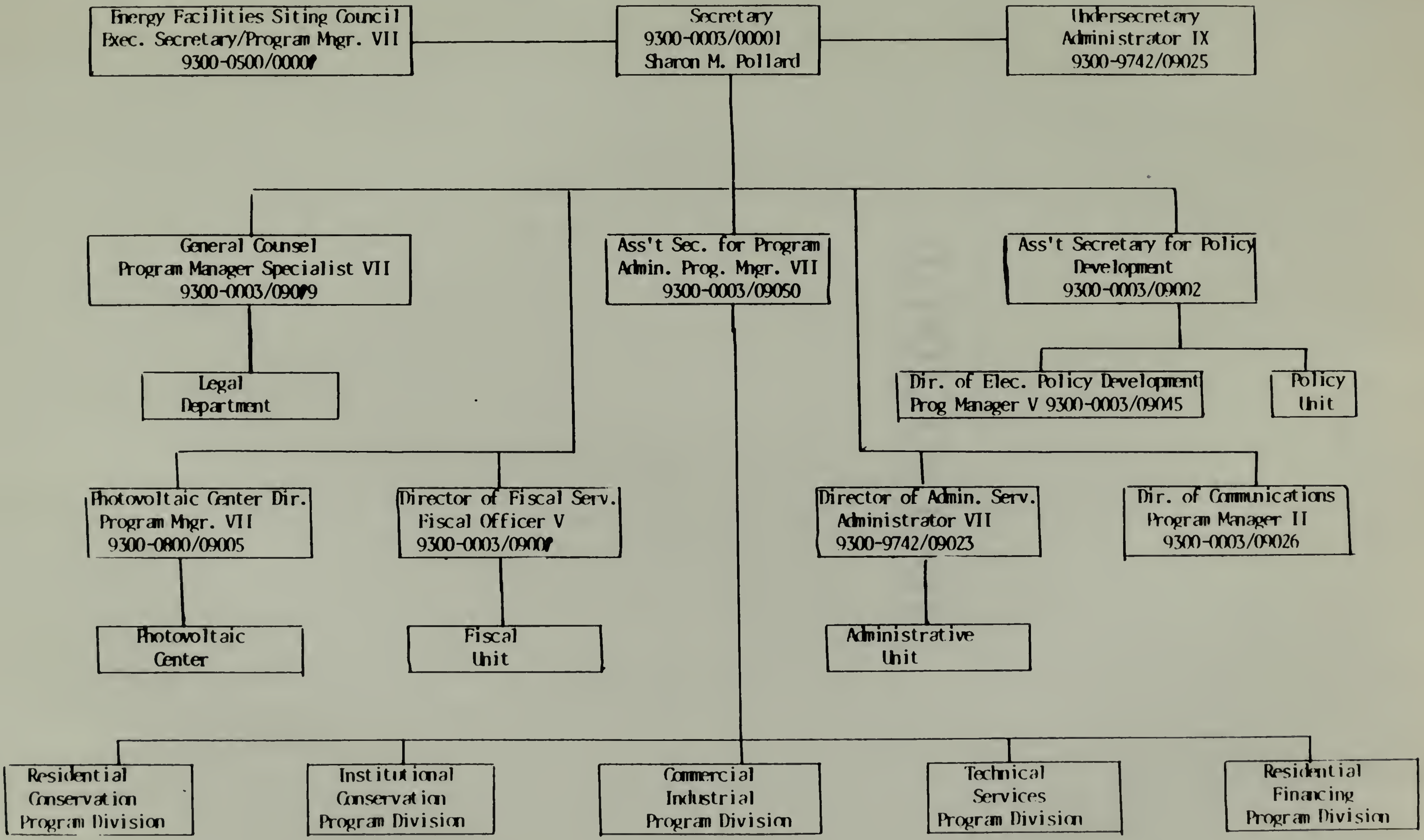
EXECUTIVE OFFICE OF ENERGY RESOURCES



II. POLICY UNIT

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One of the primary functions of EOER, according to its statute, is the development and promotion of energy policies for the Commonwealth of Massachusetts. In fulfilling this mandate, EOER's Policy Unit has been involved in many policy areas, which are discussed below.

A. STATE ANNUAL FORECAST OF ENERGY RESOURCES (SAFER) PROJECT

Three years ago, Massachusetts was among the few industrial states in the country that did not have an independent method of evaluating the available energy policy options. Due to the vision of the state legislature, EOER's SAFER Project was conceived to remedy this situation.

Today, EOER's SAFER Project provides the only energy modeling capability for the Commonwealth of Massachusetts. No other entity, private or public, currently can supply the detail, depth of analysis, and cohesiveness that the SAFER Project does.

The SAFER Project recognizes the vital linkage between balanced economic growth and the efficient use of the state's energy and environmental resources. The recently released set of reports from the SAFER Project clearly shows the mammoth task facing utilities, EOER and the public to provide reliable and secure sources of energy for the Commonwealth without increasing the environmental toll on our natural resources. The documents analyzed the future energy needs of the Commonwealth, and mapped policy options to meet these needs. The reports were delivered to all members of the state legislature, state and regional utility executives, as well as other state agencies, to be used as a plan for our future.

EOER is currently working with the Department of Environmental Quality Engineering to explicitly incorporate environmental factors into the SAFER model structure. Upon completion, the impact of energy policies on issues such as acid rain can be studied more closely. The effect of global concerns, such as global warming, on Massachusetts' economic and energy futures can also be evaluated, and courses of action can be planned with more insight and information.

B. INTERVENTIONS

Over the past six years, many energy policy innovations in Massachusetts have occurred as a direct result of formal interventions by EOER in rate cases, rulemakings and other proceedings of the Massachusetts Department of Public Utilities (DPU) and the Federal Energy Regulatory Commission (FERC). This intervention activity has been quite different from that of the Department of the Attorney General's Utilities Division or the DPU itself. Specifically, the Attorney General operates as an advocate for consumers before the DPU, primarily seeking to minimize rates. The DPU acts as an arbiter or judge, relying almost entirely on intervenors to "build the record" in any given case to justify making any policy changes. In contrast, EOER has been identifying long-term energy policies which need changing, proposing how they should be changed, and drafting detailed proposed rules to accomplish those changes.

For example, in 1984, EOER concluded that the development of small power and cogeneration facilities in Massachusetts was lagging behind that of other New England states and falling far short of our expectations. After studying the apparent causes of this problem, EOER filed with the DPU a detailed petition and proposed a set of rules to facilitate contracting between small power and cogeneration developers and the Commonwealth's utility companies. That petition led to the creation of our present system, which is considered one of the most innovative in the nation, and which has served as the model for recent initiatives on the national level in the area of small power and cogeneration development.

Similarly, EOER concluded in 1986 that the "used and useful" standard being applied to utility investments by the DPU was contributing to our utilities' unwillingness to build new power plants despite a deteriorating electric power supply situation. EOER thus filed at the DPU another detailed petition and proposed a set of rules to change the standard from the "used and useful" hindsight standard to a forward looking "pre-approval" approach. The DPU adopted a "pre-approval" approach last summer as a direct result of EOER's efforts.

Another intervention initiative of EOER's is about to bear fruit. Roughly nine months ago, EOER became convinced that the DPU had to take a more aggressive and active role in reviewing the planning activities of our electric utilities, in coordination with the Energy Facilities Siting Council. In EOER's view, it is not sufficient for the DPU to wait until a company has made all of its decisions on how much to invest in conservation, how much small power and cogeneration to buy, and so forth, and to then judge the prudence of those decisions on an "after-the-fact" basis. While utility companies can be penalized through rate of return decreases, it is really the consumer who is penalized as a result of lost opportunities to access cheaper power or to develop conservation resources. Therefore, EOER prefers a more activist role for the DPU in reviewing all aspects of utility planning and investment.

As a consequence, in 1988 EOER filed a detailed set of proposed rules for the DPU to impose formal "least-cost planning" requirements for all electric utilities (and gas utilities in the future if possible). As described in more detail in the "Demand-Side Management Advocacy" section below, EOER anticipates that the DPU will adopt least-cost planning or "integrated resource management" rules by the end of 1989.

EOER has also intervened in rate cases over the past six years, including the Western Massachusetts Electric case in which the company sought to ratebase all of its costs for the very expensive Millstone III plant, and in several MMWEC financing cases which involved Seabrook. In those proceedings, EOER continued to press for the comparison of cheaper alternative resources versus the very expensive supply sources utilities were seeking to sell their customers. In the case of MMWEC financing for Seabrook, EOER's position that other resources were cheaper and less uncertain contributed substantially to the decision by the DPU at one point to deny MMWEC additional long-term financing authority.

On the federal level, EOER has intervened in the Federal Energy Regulatory Commission proceeding on new gas pipelines for the Northeastern United States. By retaining expert counsel and working cooperatively with the DPU, EOER's participation has been effective, producing a very favorable settlement for Massachusetts.

In summary, EOER has done what a state energy office should do--advance progressive new energy policies in a manner in which they can have some impact on future planning and resources development. EOER's intervention program has been one of its most successful methods for accomplishing that goal.

C. COGENERATION AND SMALL POWER TECHNICAL ASSISTANCE PROGRAM

EOER provides essential technical assistance to developers of cogeneration and small and independent power projects in the Commonwealth. Developers face a complex regulatory environment in Massachusetts. EOER staff spend several workdays each week responding to technical and regulatory questions from parties involved in private power development. EOER has the unique expertise to provide comprehensive assistance regarding Massachusetts' regulations as they relate specifically to cogenerators and small power producers.

Cogeneration and small power production are two of the fundamental elements of Massachusetts' energy supply policy.

Entrepreneurs will invest billions of dollars to develop these types of projects. Yet, delays and uncertainty threaten a project's viability. The timely and accurate technical assistance provided by EOER has made the difference between a project's success or failure in a number of instances. A track record of project failures could stifle the development of the private power industry in Massachusetts, forcing the implementation of more costly or environmentally harmful electricity generation technologies or result in outright electricity shortages.

D. ENERGY BUILDING CODE REVISION

During 1986 and 1987, EOER financed and oversaw the technical work required for the revision of the energy section of the Commonwealth's building code. This code had not been revised for a decade, despite dramatic changes in energy prices.

The revised code became effective on October 1, 1988. It will promote the conservation of energy by requiring high standards of energy efficiency in the design and construction of new commercial and residential buildings. Savings to Massachusetts consumers will exceed $200 million by the year 2000, while reducing the need for new electricity supplies.

EOER is continuing to promote the effective implementation of the revised building code by providing training to engineers, architects, and builders. EOER held three highly successful Building Code Workshops this past summer, during which over 650 building professionals were instructed in all aspects of compliance with the revised code.

E. ENVIRONMENTAL POLICY COORDINATION EFFORT

EOER has assumed a leadership role in working to strike a balance between energy supply and environmental protection goals in the development of state policy. EOER participates in the Massachusetts Acid Rain Work Group, the Interagency Work Group on Energy and the Environment, and has worked with the New England Cogeneration Association to plan and organize a conference dedicated to energy development and the environment. EOER is also working with the Department of Environmental Quality Engineering to prepare an environmental permitting guidebook for cogenerators and small power producers.

Environmental considerations will play an increasingly important role in the development of future energy supplies in the Commonwealth. EOER is working to incorporate such considerations into the state's energy supply planning process in a systematic manner. EOER believes that if energy policy and environmental policy are to move ahead successfully, they must move together in a coordinated manner. In addition, EOER has facilitated constructive communication between the energy industry and environmental regulators, two groups which often fail to appreciate each others' legitimate concerns.

F. THE MASSACHUSETTS APPLIANCE EFFICIENCY PROGRAM

In 1986, the Massachusetts Legislature enacted the Appliance Efficiency Standards Act which set minimum energy efficiency standards for certain appliances which are sold, installed or offered for sale in the Commonwealth on or after January 1, 1988. The Act applies to refrigerators, freezers, water heaters, showerheads, and fluorescent lamp ballasts and luminaires. The standards are expected to result in as many as 200 megawatts of electricity savings in Massachusetts by the year 2000. In addition, the standards are one of the most cost-effective and environmentally sound methods of reducing electricity demand in Massachusetts.

In 1988, the Massachusetts Legislature expanded the Act to include standards for lamps (lightbulbs) used by non-residential customers. EOER is currently in the process of developing these standards for implementation in 1989.

The Appliance Efficiency Standards legislation directed EOER to promulgate regulations for the certification and testing of the covered appliances, to enforce the standards and to annually publish directories of complying models. To date, EOER has certified hundreds of manufacturers' products and has published separate directories for each of the products covered by the appliance efficiency law. The purpose of these directories is to assist consumers, retailers, wholesalers, the appliance industry and enforcement officials in determining which models of appliances may be legally sold, offered for sale, or installed in Massachusetts.

In addition, EOER has conducted periodic, on-site visits of appliance distributors and retailers' establishments throughout the Commonwealth. Also, EOER reviews newspaper advertisements and circulars of covered products to ensure compliance. As a result of these efforts, EOER has found that products which do not meet the state's standards were being sold in Massachusetts. EOER has taken the necessary steps to have the products removed from the noncomplying stores.

The appliance efficiency program is very important in assisting consumers in selecting appliances which are energy efficient. Utilizing energy efficient products can help Massachusetts consumers save up to $100 a year per household, and will save consumers collectively over $400 million by the year 2000.

The only drawback of this program, from EOER's perspective, is that when the standards were passed in 1986 and augmented in 1988, no new resources were provided to run the program. EOER was able to hire one new employee to do field inspections, but this was done utilizing existing funds. The internal administration of the appliance efficiency program, which involves the paperwork required to certify thousands of individual appliance and showerhead models for sale in the Commonwealth, had to be assigned to existing staff who normally do emergency planning and other vital functions.

G. MMWEC TECHNICAL ASSISTANCE

For approximately four years, EOER's Policy Unit provided "free" technical assistance and consulting services to light department managers and light commissions of communities which are members of the Massachusetts Municipal Wholesale Electric Company (MMWEC). Given the high rate increases and supply difficulties created by these communities' heavy investments in the Seabrook nuclear power plant, every effort was made to help these communities plan for a better energy future.

EOER's MMWEC technical assistance program included free services for modeling the rate and load impacts of specific energy conservation programs for individual communities. Also, the Program Division of EOER designed special components for existing municipal grant programs to help meet the special needs of MMWEC communities. In particular, grant programs began to emphasize savings in electricity, not just oil and natural gas. Currently, EOER's Policy Unit continues to assist individual MMWEC communities on an "as requested" basis.

EOER maintains close contact with the Massachusetts Municipal Wholesale Electric Company (MMWEC) in order to provide technical assistance on EOER conservation programs and policy initiatives. For example, staff from the Policy Unit serve on MMWEC's Conservation and Load Management Task Force to assist in the development of energy efficiency programs for MMWEC members. In addition, EOER has provided technical assistance and information from its own conservation programs in order to promote those programs for MMWEC member departments. Such efforts have provided substantial benefits to the MMWEC system which has little staff or resources for developing their own energy efficiency programs.

H. DATA COLLECTION

During normal times, energy price, supply and demand information is important in order for state government to determine energy availability, to explain the current situation as compared to historical developments, and to forecast future energy and economic outlooks. The information becomes extremely important for effective management of a potential or an actual energy emergency.

In Massachusetts, EOER has the responsibility and the authority to collect energy data; as such, information is collected on a regular basis. International, national, regional and state data is gathered by means of numerous EOER telephone surveys and required reports, trade publications, newspapers, reports from the Energy Information Administration (EIA) of the federal Department of Energy (DOE), and other sources.

EOER has designed an energy data collection system based on information derived from the above-mentioned research. The critical objectives of the data system are:

1) to provide advance notice to state government decision makers that there is a potential problem or new market trend;

2) to provide decision makers with information on what emergency planning actions should be reviewed for implementation and to allow the lead time necessary for such actions; and

3) to generate information which the general public, media, and other government or public entities request of EOER.

Some types of data collection which EOER routinely performs are:

Home heating oil and gasoline price surveys

EOER regularly conducts retail price surveys via telephone calls to approximately 90 oil dealers throughout Massachusetts. During the heating season, the latest survey information on the price of oil is published in a regular "Petroleum Update" and distributed to local newspapers.

During the driving season, a similar price update is published regarding gasoline prices. EOER surveys about 60 service stations for their price of leaded, unleaded and premium gasoline at both full-service and self-service stations.

Compilation of oil inventory and supply data

With nearly 55% of Massachusetts households and businesses still dependent on oil for space and hot water heating, the state can ill afford another round of oil supply shortfalls as occurred during the 1979 heating season. Therefore, EOER regularly evaluates the petroleum stock situation at all levels of distribution -- local, regional, and national -- to monitor the availability of product and the potential for supply shortages and price spikes. The supplies which EOER monitors include crude oil, gasoline, distillate oil and residual fuels. In addition, EOER monitors supply data from major natural gas suppliers serving Massachusetts to anticipate potential problems. Similarly, EOER collects supply and demand data for electricity.

I. OIL AND GAS POLICY DEVELOPMENT

The development of a more diverse, reliable and environmentally attractive fuel mix are the central goals of oil and gas policy at EOER. Despite considerable progress over the last decade, much more needs to be done. The Commonwealth remains overly dependent on unreliable sources of imported oil and thus highly vulnerable to potential future oil supply disruptions. The probability and potential impact of such disruptions is expected to increase significantly over the next few years as domestic oil production will likely continue to decline and OPEC regains its dominance over the world oil market. A continued effort to promote fuel diversification is required to minimize the adverse impact on Massachusetts should such a disruption reoccur.

EOER is focusing on the development of new natural gas pipeline supplies for Massachusetts. Natural gas is more environmentally benign than oil or coal, and a large increase in supply is needed to fuel new power plants to ensure adequate electricity supplies for the Commonwealth in the future. Natural gas is also underutilized in Massachusetts compared with the rest of the country. EOER is currently playing an important role in the "open season" proceeding at the Federal Energy Regulatory Commission to bring new gas supplies to the Northeastern United States. Our efforts contributed to a successful achievement of a settlement recently which will increase the pipeline capacity serving Massachusetts by more than 50 percent.

Other important aspects of oil and gas policy at EOER include the development of policies to foster greater oil and gas conservation; the forecasting and analysis of short- and long-term fossil fuel prices, supplies and demand; and the development of Massachusetts positions on major national oil and gas policy initiatives (e.g. oil import fees and other energy taxes, natural gas price deregulation and so forth).

J. DEMAND-SIDE MANAGEMENT ADVOCACY

One of the greatest opportunities for developing energy efficiency in Massachusetts is through aggressive actions and investments by electric and gas utility companies. Energy efficiency can meet utilities' future power supply needs at low cost and with minimal environmental and social impacts. Electric and gas companies can tap this resource through programs which provide information, energy efficient equipment, financial incentives, and technical assistance to encourage customers to improve the efficiency with which they use energy. Therefore, EOER's Policy Unit has worked directly with utility companies and the Department of Public Utilities (DPU) to promote such conservation programs.

In 1988, EOER helped to initiate a collaborative process with six of the Massachusetts electric utilities, the Conservation Law Foundation, the Attorney General's office, and the Massachusetts Public Interest Research Group to develop comprehensive, aggressive energy efficiency programs for implementation by the Commonwealth's electric utility companies. EOER has played an important role in designing these programs by providing expertise and data from its experience in running conservation programs, promoting conservation policies, and providing expert testimony before the DPU. This collaborative process is a nationally unprecedented energy efficiency effort which is designed to begin providing conservation programs to Massachusetts consumers by mid-1989.

In addition to working with utilities, the Policy Unit has worked with the Department of Public Utilities, the Energy Facilities Siting Council (EFSC), and others to fundamentally revise the regulatory framework that defines how electric utilities plan and develop new power supplies. EOER proposed regulations for the DPU which require that each utility prepare a "least-cost resource plan" for review by the DPU and the EFSC every two years. This process would encourage both greater utility planning efforts and improved public input to utilities' power supply plans. The regulations also establish a more efficient regulatory process between the DPU, the EFSC, and other state regulatory agencies. This "least-cost planning" process is expected to result in greater use of energy efficiency programs, additional small and independent power development, greater fuel diversity, more environmentally benign power supplies, improved adequacy of supplies, and lower electricity rates. The DPU has used EOER's proposal towards establishing such a framework, and now the Policy Unit is playing a major role in developing final state regulations.

K. NUCLEAR POLICY DEVELOPMENT

EOER has played a significant role in nuclear policy formation in the Commonwealth. EOER has been an active member of the Pilgrim Working Group, providing important input on the role of nuclear power in the context of energy policies. EOER has analyzed the role of nuclear power in state and regional power supplies, and the impacts of the possible unavailability of existing and new nuclear power plants. EOER's SAFER Project provides the Policy Unit with the modeling capability to assess the role and need for nuclear generation in the power supply mix as electricity and public safety concerns evolve in the region over the next few years. In addition, EOER has actively supported policies at the National Governors' Association to enlarge the authority of state governments over nuclear power plants.

EOER is uniquely suited to assess the economic viability of nuclear power plants relative to other electricity resources. EOER recently completed a study of the economics of the Pilgrim nuclear power plant, which included an analysis of the possible financial impacts on the Boston Edison Company and its customers of an early retirement of the plant. EOER intends to use this analysis at hearings before the DPU regarding the appropriate treatment of substantial costs incurred by Boston Edison at the Pilgrim plant.

In general, EOER believes that the agency should have a continuing role in nuclear policy formation for the Commonwealth, particularly with respect to power supplies and the economic impact of alternative policy recommendations.

III. FEDERALLY FUNDED AND MANDATED PROGRAMS

III. FEDERALLY FUNDED AND MANDATED PROGRAMS

EOER also receives funding from and administers several federally funded programs in the Commonwealth of Massachusetts. These are discussed below.

A. STATE ENERGY CONSERVATION PROGRAM (SECP)

The federally funded State Energy Conservation Program (SECP) was first authorized in 1975 and was subsequently supplemented in 1976. This national program provides direct funding to the Commonwealth of Massachusetts to carry out the following objectives:

1. To enable states to develop and implement conservation plans that will reduce projected energy consumption by at least 5 percent;

2. To develop each state's capability in comprehensive energy conservation planning and implementation; and

3. To provide states with sufficient technical support to implement various energy conservation programs.

As part of its federal obligation in receiving the funds, EOER is required to implement five mandatory program measures which include developing mandatory lighting efficiency standards for public buildings, developing programs to promote the availability and use of car pools, van pools, and public transportation, and developing mandatory thermal efficiency standards and insulation requirements for new and renovated buildings. These and other efforts performed by EOER utilizing SECP funding are documented in an annual plan which is submitted to the U.S. Department of Energy.

The State Energy Conservation Program also provides a context for the variety of resources which EOER manages in an attempt to accomplish three broad goals of the agency:

1. To raise public awareness of the economic benefits of energy conservation;

2. To increase the amount of public and private investments in energy conservation in the residential, commercial/industrial, and institutional sectors; and

3. To increase the amount of public and private investment in alternative energy technologies.

Federal funding for SECP has declined by almost 65% since the beginning of the Reagan Administration. EOER is receiving $189,000 in SECP funding in the current fiscal year. These funds are primarily allocated to pay the staff salaries of the personnel who carry out the federal mandates, as well as to manage the energy conservation programs which are funded through oil overcharge funds.

B. INSTITUTIONAL CONSERVATION PROGRAM (ICP)

The federal Institutional Conservation Program (ICP) provides 50% matching grants for energy conservation activities in public and private nonprofit schools and hospitals. The ICP is a national program that is operated by the 56 energy agencies: one in every state, territory, and in the District of Columbia. The program is administered in Massachusetts by EOER.

The ICP provides matching funds to eligible institutions which are used to provide technical audits (TAs), which are conducted by professional engineers, and which concentrate on capital improvements to save energy, and to help finance capital measures (ECMs) identified by the TA studies.

During the past ten grant cycles, EOER has been successful in implementing the most effective ECMs, having a substantial number of TA's performed, and increasing the awareness of good energy conservation practices in building operation and maintenance for the eligible institutions. The ICP funding cycles have been a highly competitive process through which approximately $20 million in grants have been awarded.

In February of 1989, EOER announced cycle 11 of its ICP program, with an application deadline of April 14, 1989 for ECMs and TAs. A total of $957,000 has been allocated by DOE for this cycle. Under this program, EOER makes recommendations for awards to DOE. DOE is scheduled to announce the final ICP cycle 11 awards at the end of August, 1989.

Currently, EOER is managing 51 grants from previous ICP cycles, which are in various stages of the capital improvement process.

C. ENERGY EXTENSION SERVICE (EES)

The Executive Office of Energy Resources administers the federally funded Energy Extension Service (EES) program for the Commonwealth of Massachusetts.

The Energy Extension Service was established by Congress in 1977. The program is operated nationally by the U.S. Department of Energy with a mandate to provide localized energy conservation outreach and assistance to "small energy consumers" in the residential, commercial, industrial, and municipal sectors.

Through the EES program, EOER provides informational and educational services to the citizens of Massachusetts. The purpose of these activities is to provide consumers with the capability to make "informed energy decisions".

In the early and mid 1980's, EOER utilized EES funding to establish and operate a variety of energy education, outreach, and demonstration projects in Massachusetts. Some of the EES projects that were operated since 1983 include:

o An Innovative Energy Conservation Grant Program (1984-1987) that awarded small grants to community-based organizations to develop creative new programs that would encourage energy conservation and renewable energy use;

- An Energy Employment Training Program which provided job training to low-income, minority heads-of-households in energy-related fields; and

- An Elderly Advocacy Program (1983-1986) which provided grants to Councils on Aging to conduct local outreach and advocacy programs to increase elder access to existing energy conservation programs.

For the last two fiscal years, the EES funding that EOER has received has been greatly reduced from previous years. In FY 1980, for instance, EOER received $625,000 in EES funds. In FY 1989, EOER received $85,000.

As a result of this reduction in federal funding, over the last two years, the focus of EOER's EES program has been on providing two major programs: (1) Information Dissemination and (2) funding the Circuit Rider program (which is discussed in the bond programs section of this paper).

Through the Information Dissemination component of EOER's EES program, EOER is involved in a number of efforts to provide information to the public about energy conservation and renewable energy issues. EOER has sponsored and cosponsored national conferences on subjects such as utility company demand-side management issues and solar energy concerns. EOER also produces and distributes publications for consumers on energy conservation and alternative energy issues, and publishes a quarterly newsletter to inform consumers about EOER programs that are available to them.

D. OIL OVERCHARGE PROGRAM

Since 1983, Massachusetts has received eleven oil overcharge settlements. These have totalled more than $110 million received from oil companies that overcharged their customers during the energy crisis of the 1970's. The money that EOER has received has primarily financed programs that achieve energy conservation in the residential, institutional, commerical/industrial, and transportation sectors of the Massachusetts economy. Funds have been used to weatherize homes, to conduct energy audits and to make energy conservation improvements in stores and factories, to provide grants and other assistance to local governments and private institutions, and to educate the public about energy conservation.

The two largest sources of oil overcharge funds that the Commonwealth has received have been from the Exxon Corporation and from the Stripper Well settlement, which have totalled more than $105 million. The Executive Office of Communities and Development (EOCD) is using $52 million of the Exxon funds to expand its programs for weatherizing the homes of low-income families. EOCD also expended $7 million in Stripper Well funds to augment reduced federal funding for the FY 1988 low-income fuel assistance program. EOER is using $18 million of Exxon funds and $18 million of Stripper Well funds for three energy conservation programs: the Home Energy Assistance Team (HEAT) residential loan program; the Nonprofit Energy Efficiency Program (NEEP) to assist nonprofit, tax-exempt organizations; and the Energy Advisor Service (EAS) to assist Massachusetts manufacturing firms. These programs are discussed in further detail in this document.

The Commonwealth has also received a number of smaller oil overcharge refunds, totalling several million dollars, for which EOER has designed restitutionary programs which are targeted to the transportation sector of the state's economy. EOER has worked with a number of other state agencies, such as the Executive Office of Transportation and Construction, the Department of Public Works, the Massachusetts Turnpike Authority, and the Metropolitan District Commission to design and implement programs to promote energy efficiency by improving traffic flow and safety, and encouraging commuters to use alternative methods of transportation.

IV. PROGRAMS MANDATED BY STATE LAW

IV. PROGRAMS MANDATED BY STATE LAW

A. ENERGY CONSERVATION SERVICE (ECS)

Since 1980, EOER has directed Massachusetts' fifty-seven gas and electric utilities in the delivery of the Energy Conservation Service (ECS) to all Massachusetts residents. The ECS Program provides residential utility customers with an energy audit, which is an on-site inspection of the energy used in the customer's home. At the time of the audit, customers receive a report of the audit findings, along with prioritized recommendations for making the home more energy efficient, and a computer analysis of the potential energy savings which would result from the implementation of the recommended cost-effective energy conservation measures and practices.

The ECS Program recognizes that education alone does not save energy and that action must result from the audit visit. Therefore, during the audit, low-cost materials (e.g., caulking and weatherstripping) are installed in the client's home to demonstrate their proper application and installation. Customers are also encouraged to purchase additional materials -- either through the utility's ECS Program's bulk purchase service or through local merchants -- to complete the installation. Typically, a water heater wrap, low-flow showerhead and water saving devices are installed in the home at the time of the audit. This means that automatic energy savings will result from the audit.

Following an ECS audit, customers receive additional follow-up services, known as "equivalent services", which are designed to assist customers in implementing the recommended energy conservation measures either on their own, or by working with a contractor. Through this component of the ECS Program, utility companies provide site-specific work specifications, assistance in finding and selecting a contractor, developing a working contract, and getting a contract signed, and inspection of the energy conservation measures following their installation to ensure that the measures are installed properly to save energy. With the final post-installation inspection, the customer has completed the ECS process, from education to implementation.

Massachusetts established the Energy Conservation Service (ECS) Program, through Chapter 465 of the Acts of 1980

> "to promote the prosperity and general welfare of its citizens ... by encouraging citizens to take steps to immediately improve the energy efficiency of all residential buildings in the Commonwealth." (Chapter 465 of the Acts and Resolves of 1980.)

The ECS Program was instituted in response to "world petroleum shortages, rising petroleum prices, and excessive reliance on imported petroleum products by the Commonwealth" (ibid.), and in response to the federally mandated Residential Conservation Service (RCS).

The federal RCS Program was instituted in 1978 by the National Energy Conservation Policy Act, was expanded in 1980 by the Energy Security Act, and was modified by the Conservation Service Reform Act of 1986. The federal RCS Program requires large electric and gas utilities and participating home heating suppliers to encourage residential energy conservation by providing class-A energy audits, assistance in locating reliable contractors to install energy conservation and renewable resource measures, information on financing, and consumer protection assistance.

The Massachusetts ECS Program exceeds the requirements of the federal RCS mandate by requiring all gas and electric utilities in the Commonwealth to participate in the Program, allowing utilities to offer ECS services through a cooperative venture (as through the Mass-Save program), including multifamily buildings and individual apartments in buildings of all sizes, and requiring auditors to demonstrate the installation of low-cost and no-cost measures. While the oil crisis of the 1970's fueled the initial call for the ECS Program, the issues of price and supply for electric and gas energy sources are still now of vital concern in Massachusetts.

Since January, 1980, almost one half-million energy audits have been performed under the ECS Program. Using DOE estimates of energy saved through programs of similar design to the Massachusetts ECS Program, each energy audit saves an estimated 15.63 million BTUs (MBTU) annually. Therefore, in FY 1988 alone, over 579,495.64 MBTUs, or $5,273,410, were saved through Massachusetts customer participation in the ECS Program.

On an annual basis, EOER is responsible for:

1. Setting goals for the program which focus on increasing participation through energy audits and equivalent services (e.g., installation and arranging services), which are designed to directly result in actual energy conservation;

2. Monitoring utility compliance with established goals and implementation plans;

3. Monitoring the quality of services offered through an on-site evaluation of ECS audits;

4. Adapting the program to increase participation by underserved groups such as: low-income and minority ratepayers, the elderly, multifamily building owners, and tenants;

5. Reviewing, approving, and monitoring the implementation plans of ECS programs offered through investor-owned and municipal utility ECS-programs;

6. Soliciting public input through quarterly meetings of the ECS Advisory Committee (comprised of representatives of the state legislature, public interest groups, minority populations, financial and engineering professionals, and program operators) and of task forces on improved program design and delivery.

The ECS Program is entirely funded through an assessment against the state's gas and electric utilities. Budget and cost recovery undergo annual review by the state Department of Public Utilities. EOER testifies in such review as to the quality and design of utility plans for delivery of the ECS Program.

EOER's administration of utility delivered ECS Programs assures customers throughout the Commonwealth access to the same core services. On-going site visits and quality control monitor the quality and consistency of the service delivery, recommend service adjustment, and track the implementation of service improvement. Program administration by EOER results in collaboration among utility programs on training, evaluation and program development.

EOER's experience in overseeing and facilitating collaboration among the independent gas and electric utilities in the Commonwealth under the ECS Program has benefitted other energy conservation efforts of the office. For instance, EOER has played a key role in the recent "collaborative effort" among major electric utility companies and conservation organizations to design cost-effective conservation and load management programs. EOER provided technical assistance and statistical data to the working group responsible for developing the programs for the residential sector. More important, as utilities developed working relationships under the collaborative process, EOER facilitated the overall effort by defining goals and maintaining clarity of purpose, reviewing work in progress, and eliminating obstacles to successful collaboration.

In addition, EOER's management of the ECS Program has resulted in an integration between the ECS Program and EOER's residential HEAT program. For instance, one of the requirements for participation of a consumer in the HEAT program is a the successful completion of an ECS audit.

B. COMMERCIAL CONSERVATION SERVICE (CCS)

The Commercial Conservation Service (CCS) was established by Massachusetts General Law, Chapter 25A, Section 11A and authorized the Secretary of Energy Resources to establish requirements for all of the Commonwealth's utilities to offer conservation services to their small commercial customers. As a result, EOER promulgated CCS regulations in May of 1985, which required utility companies to offer energy audits and related services to this historically underserved subsector of the commercial class. In the first several years of the program, over 300 audits were delivered to eligible customers.

In FY 1989, EOER completed a major revision of the regulations governing utility conservation programs for the commercial sector. The goal of this revision was to better integrate the CCS program with the "least-cost" principles and practices that EOER and other state regulatory agencies have been encouraging utilities to adopt. In the revision, EOER needed to consider that gas and electric utilities often face very different issues in their supply and demand planning. In addition, the proper regulatory role for EOER was evaluated, including an assessment of the probability of active utility conservation programs in the absence of a prescriptive regulation.

The new CCS regulations require utilities to report on their commercial conservation activities. The goals of the reporting requirements are to encourage the utilities to explicitly consider the marginal cost of providing conservation services when evaluating energy conservation programs, and to set goals for commercial conservation activities. During the next year, EOER will also test the assumption that utilities will continue to offer effective commercial conservation programs in the absence of a detailed regulation.

C. SHARED SAVINGS

In FY 1984, state government spent close to $100 million to heat, cool, and light its approximately 5,000 buildings. Much of the money was, unfortunately, wasted as many state facilities are overlit or have inefficient heating and cooling systems.

To address this problem, EOER worked closely with DCPO to develop a Shared Savings Pilot Project, which was begun five years ago. The Shared Savings Pilot Program uses innovative financing techniques to fund the implementation of energy conservation measures in state facilities. These measures are installed and operated by a competitively-selected contractor at no cost to the Commonwealth.

To date, four facilities have undergone efficiency retrofits under this program. The results have been impressive. For example, at Massasoit Community College, energy consumption has been cut by 40%, reducing the facility's energy bill by $285,000 in the program's first year. Of that, 20% or $57,000 will be kept by the state under the terms of the shared savings contract. In the McCormack and Saltonstall Buildings, $850,000 in energy is being saved on an annual basis. Of that, the state keeps 50%, or roughly $425,000 a year. A similar pilot program for local governments was conducted by EOER for about a dozen communities. The results were proportionately impressive for the smaller buildings which are common at the city or town level.

Based on the success of the pilot program, DCPO and EOER are expanding the program to approximately twenty state facilities over the next three years. Once all projects are on line, the state will have benefitted from over $65 million in avoided capital costs, with annual energy savings of more than $7 million.

D. BOND PROGRAMS

EOER also operates several programs which are funded by bonds authorized by the state legislature. These programs include:

(1) The Energy Audit and Conservation Improvement Programs

EOER has been actively involved in assisting the

Commonwealth's cities and towns in conserving energy since 1980. This effort has been accomplished through two state funded bond programs. The Energy Audit Program provides funds for a community to hire an engineer to perform technical energy audits on its public buildings. The Energy Conservation Improvement Program (ECIP) provides funds to follow up on the energy audit by installing energy conserving capital improvements in eligible buildings. These improvements include: envelope insulation, heating system repair and replacement, energy controls, storm windows, weatherstripping, and building energy management systems.

Through Chapter 700 of the Acts of 1983, the Massachusetts Legislature authorized $20 million to be awarded to state and local governments for technical energy audits and capital improvement energy conservation measures. Of the $20 million available, $8 million was earmarked for municipalities and $12 million for state buildings. The Legislature approved a similar bill in 1987 (Chapter 670 Acts of 1987) for $15 million, all of which was earmarked for cities, towns, counties, and regional school districts. While grants are made in both programs for 100% of the funded activity, there is a 30% repayment provision.

The first ECIP awards were made in September of 1984 and continued through the fourth cycle of ECIP. As of November 30, 1988, a total of $16.30 million in ECIP funding had been awarded by EOER to municipalities for the installation of energy conserving capital improvements in eligible buildings. EOER is continuing to review an additional $5.5 million in applications which were submitted last fall, but which were not awarded prior to the A&F bulletin which restricted new bond obligations as of November 30, 1988.

Since 1985, EOER's Energy Audit Program has provided funds for a community to hire an engineer to perform technical energy audits on their public buildings. Through this program, EOER has awarded 150 grants totaling $1 million. An additional $650,000 in applications were received prior to the November 30, 1988 bond obligation cut-off.

Since 1985, EOER has made a special effort to solicit the participation of smaller communities in EOER's grant programs. In 1985, EOER introduced a Circuit Rider Program which offers both administrative and technical assistance to communities with populations of 5,000 or under in Hampshire and Franklin Counties. Targeted to smaller communities which have historically been unable to participate in state energy grant programs due to a lack of "in-house" staff to prepare application materials and manage grants, the Circuit Rider Program has enabled these rural communities to take advantage of EOER's energy conservation programs. In March of 1986, the Circuit Rider Program was expanded to include communities with a population of 10,000 or under in Hampshire, Franklin, Berkshire, Worcester and Hampden Counties. The program continues to be very well received by these smaller communities.

To date a total of 56 Circut Rider eligible communities have participated in ECIP, receiving a total of $2.3 million for capital improvements with an estimated first year's energy savings of $650,000. A total of 63 communities have participated in EAP with a total of $198,000 having been awarded. These numbers represent a dramatic improvement in participation by smaller communities, as only $134,777 was awarded for energy improvements in these communities prior to the introduction of the Circuit Rider Program.

EOER's state-funded bond programs continue to be popular with local city and town officials across the Commonwealth. Since their inception, these programs have already saved the cities and towns of the Commonwealth $20 to $25 million in energy costs. These savings enable municipalities to reduce their expenses without sacrificing services.

EOER is currently managing 189 grants, totalling $14.4 million, which are in various stages of the audit and capital improvement process. In addition, 84 applications are now under review and would constitute $6.4 million in additional grant awards if the current bond spending ceiling is lifted.

(2) The Alternative Energy Property Program

The Alternative Energy Property Program (AEPP) was authorized by Chapter 796 of the Acts of 1979 and is operated by EOER utilizing $10 million in state bond funds. The AEPP program provides funding to municipal, state and other public agencies for cost-effective renewable energy projects. Through the AEPP program, EOER has awarded funds for alternative energy projects in the areas of passive solar, wind, hydro, geothermal, and photovoltaics. Most recently, as a result of an initiative of Governor Dukakis, EOER has actively promoted the cost-effective utilization of photovoltaics through the Massachusetts Photovoltaic Utilization Program (MassPUP), a program within the AEPP.

The AEPP was established to fund renewable energy projects that would help to reduce the Commonwealth's dependence on imported fossil fuels, and to save money for Massachusetts taxpayers. To date, the AEPP projects have saved tens of thousands of dollars for Massachusetts communities. In addition, these projects have served to educate the public as to the reliability and economics of renewable energy projects.

Over its eight year history, the AEPP has evolved with the changing national and regional energy economies and the development of the renewable energy industry. For instance, the most recent emphasis of the AEPP has been on exploring innovative applications of renewable energy technologies as a means of lowering electricity expenditures.

Over the years, EOER has funded projects in a wide range of renewable energy technologies through the AEPP. EOER is currently managing 29 AEPP projects in various stages of construction, totaling $5.3 million. Several successfully completed AEPP projects include:

> Pittsfield - Through the AEPP, EOER has funded a 225 KW hydropower project, which consists of a turbine generator installed in a conduit from the Ashley Reservoir, which will produce between 714,000 and 874,000 KW hours of electricity for the Pittsfield area.

Boston English High School - Through the AEPP, a ground coupled heat pump was installed in this all-electric school which is expected to increase Boston English's electrical efficiency by as much as one-third, and to save the school $25,000 to $40,000 a year in energy bills. This heat pump extracts low temperature heat from the ground and uses a compressor to increase the heat's temperature. The higher temperature heat is then distributed throughout the school.

Peabody Apple Barn - Solar and hot water heating systems were installed in the city's apple barn through the AEPP, to increase the temperature comfort in that facility. Together, these systems will generate an energy savings of 39,000 KW per year and an annual cost savings of $3,300.

In addition, in 1986 EOER awarded over $800,000 in MassPUP funds for the installation of twenty-three PV projects in state agencies. Many of these projects have been providing environmentally and completely clean renewable energy during the past year. Among the successful MassPUP installations are the following:

Department of Environmental Management, Granville State Forest

This grant has resulted in photovoltaic power providing for indoor and outdoor lighting, indoor running water, and a two-way radio for a remote site in one of the Commonwealth's state forests.

Department of Environmental Management; Boston Harbor Island Management Center

The site for this installation is a unique floating house boat which is utilized by the island management staff in the Boston Harbor. MassPUP has funded a photovoltaic installation which is providing the power for indoor and outdoor lighting, refrigeration, radio communication and water pumping.

Metropolitan District Commission; Central Services Division

Through MassPUP, photovoltaic battery chargers are being installed in thirty-two emergency vehicles, including large earth movers, buses and highway plows. These PV systems will maintain a battery state-of-charge to ensure that these intermittently-used vehicles remain ready for use.

V. OTHER PROGRAMS OF EOER

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A. HOME ENERGY ASSISTANCE TEAM (HEAT)

EOER has allocated a total of $31.6 million of Exxon and Stripper Well oil overcharge funds for the Home Energy Assistance Team (HEAT). All but $1.5 million of this amount is targeted to small residential properties of one to four units. The balance is targeted to serve five to fifty unit residential rental properties. The small property component, which was begun in September, 1986, subsidizes the interest on conventional loans taken by households with annual incomes below $75,000 for making approved energy conservation improvements to their homes. The program subsidizes up to four years or $4,000 of interest costs, with the borrower responsible for repaying the principal on the loan.

In slightly more than two years (through December 1988), the HEAT program has paid the interest on 20,068 loans to middle income families, which has involved $91 million in energy conservation investments in the Massachusetts economy. As a result, Massachusetts consumers will save over $30 million in avoided interest costs, and will realize an estimated $8 million annually in energy savings. By the time the small property component of the HEAT program is completed early in FY 1990, $100 million will have been invested in the Commonwealth through approximately 22,000 loans.

The typical participating consumer in the HEAT program borrows $4,534 over an average term of 53 months to perform two or more separate types of energy improvements. About 54% of all HEAT clients perform major heating system work, 52% do window improvements, and 33% add attic and/or wall insulation to their homes.

The income distribution of HEAT participants is comparable to that of the population as a whole. Approximately two-thirds of HEAT program participants have gross annual incomes below $45,000. Forty-one percent of the program participants have gross annual household incomes below the median Boston area income as defined by the U.S. Department of Housing and Urban Development, which is $26,180 for a one person household and $40,392 for a household of five.

The $1.5 million component of the HEAT program, which serves five to fifty unit apartment buildings, will commence in early 1989 and is planned to operate through FY 1990. This component will operate in a similar fashion to the existing small property HEAT component, but some eligibility and benefit standards will be modified to meet the needs of the traditionally underserved small multifamily sector. Benefits received through this program include a seven percentage point interest writedown on a loan, up to a maximum of $1,000 per unit. No income limits will apply to multifamily borrowers. The list of eligible energy improvements will be adapted to the characteristics of multifamily buildings.

B. NONPROFIT ENERGY EFFICIENCY PROGRAM

EOER has also been implementing a new Nonprofit Energy

Efficiency Program (NEEP) as of November, 1988. Using $5 million in Stripper Well funds, this program is planned to operate for two years. Up to 1,000 nonprofit, tax-exempt organizations will receive a comprehensive package of technical and financial assistance to be used in developing and implementing a cost-effective energy management plan in facilities which are owned or leased by the nonprofit organization.

The nonprofit program is an EOER priority because most energy efficiency and utility load management specialists agree that the nonprofit sector offers a substantial potential for cost-effective energy conservation improvements to be made, but they also agree that this sector is often difficult to reach. Nonprofit organizations are extremely constrained in their operations by limited capital and an institutional reluctance to divert scarce resources from their central mission. In addition, nonprofits often occupy older facilities with a history of deferred maintenance. Many of these organizations have limited personnel and expertise to manage building operations and energy costs. Overcoming these barriers requires a carefully structured, accessible combination of incentives.

EOER's NEEP will not only save energy, but by reducing the operating costs of nonprofit organizations, will also free up resources for the nonprofit's goals. This should save the public money as nonprofit organizations are often publicly funded. By opening the nonprofit market, EOER's nonprofit program has an opportunity to demonstrate successful approaches to the Commonwealth's utilities, which are increasingly seeking new conservation and load management opportunities.

EOER's nonprofit program will provide specific services to eligible organizations, which will include: energy audits, recommending capital energy improvements and appropriate operations and maintenance practices, assisting the nonprofit manager in developing and implementing an energy management plan, inspecting the completed work, and assisting with monitoring the post-installation performance of the energy improvements. The program will also provide financial assistance in implementing the recommended energy conservation measures, which may be taken by the organization either as a matching grant or as an interest reduction on financing. The financial assistance provided will equal 50% of the first $10,000 of the total energy investment to be made by the organization, 35% of the next $10,000, and 25% of the next $30,000. Thus, the maximum financial assistance to an individual nonprofit would be $16,000 of a $50,000 investment.

C. ENERGY ADVISOR SERVICE

The Energy Advisor Service, funded by Exxon Oil Overcharge funds, assists manufacturing firms in reducing operating costs and improving efficiency, by providing on-site customized engineering consultations. Despite their significant energy costs, Massachusetts manufacturers often have neither the in-house expertise nor the time to identify the full range of energy conservation opportunities in their facilities. The Executive Office of Energy Resources (EOER) has established an Energy Advisor Service (EAS) to help fill this gap by offering on-site analyses of potential energy improvements to individual businesses.

The Energy Advisor Service breaks down the technical barriers to energy efficiency improvements by Massachusetts business by providing expert consultations that identify opportunities for reducing energy budget costs and estimate the cost-effectiveness and suitability of these energy conservation measures for a particular business. The EAS is flexible enough to assist firms wherever they may be in the process of implementing energy related improvements, including evaluating alternatives, establishing priorities, and reviewing proposals. The ultimate objective of the EAS is to provide companies with whatever information and impetus they need to proceed with energy management programs and to take whatever steps or make whatever investments are appropriate to increase their operating efficiency and profitability.

Through the EAS, EOER contracts with experienced private sector energy analysts and engineers to generate recommendations for specific energy improvements to be made by a particular company. The "energy advisors" have been selected in a competitive process based on their familiarity with and knowledge of energy systems and industrial processes.

The technical analyses and recommendations of the energy advisors generally focus on direct or indirect energy consumption in manufacturing processes, including mechanicals, boilers, power (lighting, motors, and demand), heat reclamation, and general process use. Assistance provided is individualized to conform to the specific needs of each participating firm. The service provided through the EAS can include:

- overall analysis of energy conservation opportunities
- analysis of specific systems or equipment
- evaluation of alternative methods or proposals to solve a specific problem
- "handholding" in the implementation process
- follow-up engineering as directed by EOER.

EAS contractors generate written reports of their findings that include sufficient information to permit businesses to determine the economic cost and benefits of implementing various energy conservation opportunities. Oral presentations of recommendations are made to the plant management of the participating business to allow participants to ask additional questions.

The EAS program is operated on a cost sharing basis with service recipients paying a fee of $100 per day of service. These revenues are then recycled into the technical assistance pool. The EAS program cost per firm to EOER for the standard four days of service ranges from $1,500 to $2,700, depending on the contractor used. Firms may receive more than four days of service when it is justified by the energy savings potential of the company. For example, cogeneration feasibility studies typically require an extra eight days of service.

During its four years of operation, EOER's EAS program has assisted over 260 Massachusetts firms in identifying energy saving opportunities at their facilities. EOER expects that this program will assist another 100 manufacturers during the next year of operation, with potential savings identified in excess of $25,000 per firm annually.

An Energy Advisor Service analysis typically identifies savings strategies that enable the average firm to cut its energy bill by 10 to 15%. For example, Malden Mills, a large Lawrence manufacturer of textiles for the upholstery and apparel industry, received energy conservation recommendations with annual savings of $2,050,000, which would require a capital investment of $3,730,000. The Energy Advisors also recommended a 35 MW cogeneration plant for Malden Mills. Similarly, for Borden Chemicals, a North Andover manufacturer of polypropylene film for packaging, the Energy Advisor Service identified $273,000 in savings which represents 13% of the company's annual energy budget of $2.1 million.

The average payback of an EAS recommended energy conservation investment is 1.8 years, with no measure having a payback greater than two years.

D. COGENERATION PROJECT

During FY 1986, EOER initiated an investigation of the potential for cogeneration in facilities owned by the Commonwealth. This study was implemented in close coordination with the Division of Capital Planning and Operations (DCPO). Based on case studies of the cogeneration potential in fifteen state facilities, the study consultant identified between one hundred and fifty (150) and two hundred and fifty (250) megawatts (MW) of cogeneration potential in Massachusetts state facilities. The consultant's report included a recommended strategy for statewide cogeneration development.

Based on these recommendations and the comments which were received at public hearings conducted by the two agencies, EOER and DCPO have initiated a state cogeneration program, to begin with the implementation of a pilot phase. Under the pilot program, cogeneration systems will be installed in three (3) to five (5) state-owned facilities. Three of the sites have already been selected. These are the Massachusetts Hospital School, Bridgewater State College, and the University of Massachusetts at Amherst. The purpose of the pilot program is to evaluate alternatives for cogeneration project financing and development, as well as technology selection. In addition, the Commonwealth will evaluate and refine the institutional, procurement and contractural procedures necessary to implement a statewide cogeneration program.

Utilizing oil overcharge funds, EOER has retained a nationally-known consultant to assist with the procurement of and contract development with vendors for the finance, development, construction and operation of the pilot cogeneration systems. During FY 1989, additional funds will be utilized to assist DCPO with the implementation of the pilot program, including site-specific engineering studies and additional financial or legal research and analysis.

An interagency advisory group has been convened which is comprised of representatives of state agencies including DEQE, MEPA, the Department of Public Utilities, and the Purchasing Agent's Division of the Executive Office for Administration and Finance. The purpose of this interagency group is to keep respective agencies informed on the development of the state cogeneration projects and to solicit their advice and guidance throughout the development process.

VI. OTHER REQUIREMENTS OF CHAPTER 796 OF THE ACTS OF 1979

VI. OTHER REQUIREMENTS OF CHAPTER 796 OF THE ACTS OF 1979

EOER's statute requires the agency to perform many other functions which include:

A. ADVISE, ASSIST, AND COOPERATE WITH OTHER AGENCIES

EOER's statute states that the office should:

> "...advise, assist, and cooperate with other state, local, regional, and federal agencies in developing appropriate programs and policies relating to energy planning and regulation in the Commonwealth..." [M.G.L. c. 25A, 6(2)]

EOER fulfills this mandate by working with the following federal, regional, state, and local agencies:

(1) The New England Energy Directors (NEED)

The New England Energy Directors (NEED) is a committee of the New England Governors' Conference. It consists of the heads of the energy offices in the six New England states. The focus of this committee is on issues which are unique to energy offices as opposed to public utility commissions. Such issues include maintenance of federal funding for state energy conservation programs, state access to oil overcharge monies, and emergency planning for fuel shortages. For instance, in 1985 the NEED committee, led by Massachusetts, studied how the region would respond on a coordinated basis to a long-term shortage of fuel needed to generate electricity. Since energy emergency planning authority and responsibility reside with the energy offices in each New England state, it was appropriate for the NEED committee to take the lead responsibility for this planning function. The committee recommendations included the coordination of schedules for the opening and closing of restaurants, retail establishments (such as grocery stores and liquor stores), and state offices which provide essential services, during emergency periods. The Committee also identified the kinds of economic functions which should receive priority status for accessing fuel, such as police and fire departments, and hospitals. Coordination of policies such as this on a regional basis is imperative in New England and the NEED committee carries out that function with respect to issues of concern to energy offices and New England's governors.

(2) The Northeast International Committee on Energy (NICE)

The Northeast International Committee on Energy (NICE) is a committee of the New England Governors' Conference and the Eastern Canadian Premiers. It consists of the heads of the energy offices of the six New England states and the five eastern Canadian provinces. The focus of the committee is on issues of common concern to the states and provinces. These include: the implications of the Free Trade Agreement for energy trade between New England and Canada, and natural gas and electricity transmission issues.

The recent increase in New England's energy dependence on Canadian energy resources, including hundreds of millions of dollars of sales of electricity and natural gas, necessitates an ongoing dialogue and the maintenance of good relations with energy officials in Canada. The NICE committee sponsors "roundtables" twice a year on policy issues of concern to the two regions; these roundtables attract key energy decision makers from the United States and Canada, and provide an invaluable opportunity for communication.

(3) The Power Planning Committee (PPC)

The Power Planning Committee is a committee of the New England Governors' Conference. It consists of the heads of the six energy offices in New England and the chairpersons of the six public utility commissions. The focus of this committee is on regulated utilities which serve New England.

For the past three years, the PPC has focused on the very tight electricity situation within the New England Power Pool (NEPOOL).

In 1986, the PPC recommended a plan to the governors for ensuring adequate electricity supplies from now until the year 2000. The Massachusetts energy office provided all of the staff support for this historic effort. The plan was adopted by the six governors in December of 1986 and has provided the template for action in the region ever since.

During 1988, the PPC also played an important role in representing New England's interests in the Federal Energy Regulatory Commission (FERC) "open season" proceeding to bring new gas supplies to the Northeast. A committee of the PPC organized the region's input into the process, by coordinating letters to the administrative law judge handling the case at FERC. Despite the initial differences of opinion among some of the New England states as to the outcome the PPC should seek, the PPC did achieve a consensus position which has prevailed with FERC. As a result, the New England states expect to enjoy substantial new quantities of domestic and Canadian natural gas in the region by 1991, which is essential not only to ensuring an adequate supply of electricity, but also in combatting acid rain and the greenhouse effect.

(4) The National Governors' Association Staff Advisory Committee on Energy and the Environment

As a result of Governor Dukakis being a member of the National Governors' Association (NGA) Committee on Energy and the Environment, EOER represents Massachusetts on the Staff Advisory Committee (SAC). During 1987 and 1988, the SAC has been drafting a new energy policy for the nation to be presented to the governors. This policy is expected to be voted upon at the governors' meeting in February, 1989. Massachusetts has played an important role in this policy formation process, particularly with respect to moderating the stands on nuclear power development which have been advanced by the State of New Hampshire, including "least-cost planning" as a guiding principle for national energy policy formation, and requiring that the environmental impacts of possible energy policies be evaluated along with cost and national security concerns.

In the coming year, the new chairperson, Governor Kunin, has requested that the SAC focus on the greenhouse effect and its implications for national energy policy. EOER expects to play a major role in that debate, using our in-house computer modeling capabilities, which can estimate the environmental impacts of alternative energy resource utilization policies.

(5) The National Association of State Energy Officials (NASEO)

In 1982 the Reagan Administration began to dismantle most of the civilian non-nuclear programs at the U.S. Department of Energy, including the state energy conservation programs and the renewable energy research and development activities. In an effort to stop this trend, representatives from 12 state energy offices from around the country met in Washington, D.C., and formed the National Association of State Energy Officials.

The states quickly organized themselves into a nonpartisan organization which would be compatible with the various positions taken by the National Governors Association (NGA). Massachusetts was asked to serve on the original Board of Directors, which is a board that Secretary Pollard continues to serve on today.

The goals of the organization are as follows:

> To Create a National Energy Policy. As the nation entered the second Reagan term, there was growing concern around the country that the United States needed to aggressively develop a national energy policy. NASEO brought together national, regional and state

organizations to participate in the creation of such a document. A copy of NASEO's national energy policy was delivered to Governor Dukakis by the President of NASEO in the summer of 1988.

To Work with the Congress to Restore Funding for Key Energy Programs and Areas. For several years, the Reagan Administration had recommended zero funding for the conservation programs which provide funding to the state energy offices. NASEO has had great success in convincing the Congress to continue to fund these programs. It is largely due to their efforts, and those of the Members of Congress, that federal energy money is still flowing to the states.

To Work for the Passage of Important National Energy Legislation in the Congress. Through the expertise that exists with its members, NASEO has worked to reform antiquated authorization bills which affect the state energy conservation programs, supported passage of legislation to get the national renewable energy research and development program back on track, and was a key player in the passage of the comprehensive alternative transportation fuels bill (which was signed by President Reagan in October, 1988).

To Provide Energy Education Opportunities for the Staff of the Member States, and to do Research Projects on

Major Issues Affecting the State Energy Offices. From the start, the member states viewed NASEO as an organization which could provide state-of-the-art energy education opportunities to the member states. In addition, NASEO has offered the results of many energy projects to its members, which provided the states with timely and useful information.

(6) The National Academy of Science, State Energy Advisory Panel

The energy research and policy work which is carried out by the National Academy of Science (NAS) is done by the Energy Engineering Board. Three years ago, in recognition of the increasing role of state governments in the energy area (mainly due to the pullout of the federal government), the National Academy formed a State Advisory Panel to the Energy Engineering Board.

This seven member panel, which is chosen by the NAS, is made up of senior energy officials from four states (Massachusetts, New York, California and Illinois), and from three regional energy organizations (The Northwest Power Planning Council, The Southern States Energy Board and the Western States Energy Board).

The State Energy Advisory Panel has often been called upon to comment on many of the energy studies being conducted at the NAS. Most recently, the Panel has initiated a project which that would have the Academy conducting a major effort to design a national Least-Cost Planning Process for the United States Department of Energy.

(7) Other State Agencies

EOER's mandate recognizes that energy -- the production of it, the consumption of it, the price of it, the supply of it -- is a subject of concern to a broad cross-section of state agencies and other governmental bodies. One of EOER's most important functions is therefore to ensure that there is a coordinated and focused state approach to energy issues which affect state government. In carrying out this mandate, EOER has worked closely and cooperatively with eight other cabinet secretariats or agencies within them. These are:

The Department of Public Utilities (within the Executive Office of Consumer Affairs and Business Regulations). EOER has initiated and intervened in DPU proceedings on many subjects. For instance, EOER initiated proceedings that dramatically revised the state's rules affecting the development of small power and cogeneration facilities. EOER is now engaged in a proceeding to promote the adoption of a "least-cost integrated planning" system that will ultimately determine how electric utilities supply the energy needs of all sectors of the Commonwealth in the future.

The Executive Office of Economic Affairs. EOER has worked with the Executive Office of Economic Affairs and the Massachusetts Centers of Excellence Corporation (as well as the University of Lowell) in establishing and operating the programs of the Massachusetts Photovoltaic Center, which was created by EOER in 1984. EOER also works with Economic Affairs in operating EOER's Energy Advisor Service, which provides small and medium-sized businesses with professional engineering analyses of their energy systems.

The Executive Office of Communities and Development. EOER has worked with EOCD by providing oil overcharge funds for the Commonwealth's Low-Income Weatherization Program, and by promoting energy conservation in publicly-funded and assisted housing. EOER also uses state bond funds and federal funds to enable nearly every city and town in the state to make energy improvements in their public buildings.

The Executive Office for Administration and Finance. EOER works with the Division of Capital Planning and Operations on several projects to promote energy conservation in state-owned facilities: the Energy Bond Program provided $12 million for energy audits and energy conservation improvements; the Shared Savings Pilot Project has resulted in millions of dollars of energy savings in major state facilities such as the McCormack and Saltonstall buildings; and the Cogeneration Pilot Project has the potential to generate needed electricity while saving substantial money in energy costs for the Commonwealth.

The Executive Office of Environmental Affairs. EOER has worked with the Executive Office of Environmental Affairs to develop and implement a pro-environmental energy policy for the Commonwealth. Specifically, EOER has worked with the Department of Environmental Quality Engineering both on issues relating to specific energy facilities and on issues of concern to energy facilities in general, such as airborne emissions, acid rain, and water usage. EOER has also provided funding through its bond programs and oil overcharge funds for alternative energy projects at facilities owned by the Department of Environmental Management and the Metropolitan District Commission.

The Executive Office of Transportation and Construction. EOER has worked with EOTC, the Massachusetts Turnpike Authority, and the Department of Public Works to promote energy conservation in the transportation sector of the state's economy, by providing funding (from oil overcharge settlements) for vanpool programs, traffic light synchronization programs, and other traffic reduction or improvement programs.

The Executive Office of Public Safety. EOER is working with EOPS and Civil Defense (as well as with the Governor's and Attorney General's offices and the Department of Public Health) on issues relating to the Pilgrim and Seabrook nuclear power plants. EOER has also worked with the Board of Building Regulations and Standards in a major updating of the energy provisions of the State Building Code.

The Executive Office of Human Services. EOER has worked with EOHS on the design and implementation of an EOER program (using oil overcharge funds) to promote energy savings in the nonprofit sector of the state's economy, such as day care centers and other community-based human service delivery agencies.

In addition to working with the cabinet secretariats and agencies already noted, EOER has also worked on energy conservation projects, issues, and programs with the Massachusetts Housing Finance Agency, the Massachusetts Industrial Finance Agency, the Governor's Highway Safety Bureau, the Massachusetts Municipal Wholesale Electric Company, the Board of Library Commissioners, and the Inspector General.

B. ENERGY EDUCATION

As required by its statute, EOER operates and participates in energy education programs.

In the spring of 1984, the Executive Office of Energy Resources (EOER) contracted with the Massachusetts Audubon Society (MAS) to begin an Energy Education Program. The goal of this program is to increase the energy education efforts in schools throughout the Commonwealth. Teacher training workshops were designed and conducted by EOER and MAS and were targeted at schools with grades six to eight. Over a three year period, twenty-six workshops were conducted reaching more than 350 teachers. The program also prepared two energy resource guides, called Energizers, one for teachers of grades five to nine and one for teachers of grades ten to twelve.

As a result of reduced federal funding, the workshops are now often jointly sponsored with a local electric utility. Participating utilities have indicated that requests for their free energy education materials have increased since the program's inception. Several national suppliers also mentioned that while orders for energy education materials have declined across the country, orders have increased in Massachusetts and New England.

EOER is also a participant in the National Energy Education Day (NEED) program, which was established by the U.S. Congress in 1980. The purpose of the NEED project, which is affiliated with the U.S. Department of Energy, is to develop programs and communication systems that will assist with the establishment of ongoing energy education in grades K through 12 in Massachusetts public and private schools. More than 100 schools in Massachusetts are expected to participate in the NEED program in 1989. In each of the last two years a Massachusetts school has been a National Finalist in the annual NEED Recognition Ceremonies; Belchertown High School in 1988 and Dighton Middle School in 1987.

C. STATE EMERGENCY PLANS

EOER is mandated by Chapter 25A of the General Laws to prepare energy emergency contingency plans for appropriate implementation by state government. While other state agencies, such as Civil Defense, have the capability to deal with various public safety/welfare issues resulting from an energy emergency, EOER has the primary responsibility of spearheading cooperative efforts to manage an energy emergency. EOER's expertise in such situations involves a thorough knowledge of the operations of the energy industry and the key industry and governmental personnel. EOER coordinates actions of the energy industry with those of private and public agencies, collects and disseminates accurate and timely information regarding energy prices, supplies, and demand, and advises the Governor as to the proper time and sequence for the implementation of emergency measures.

In order to carry out these functions, EOER performs the following duties in the emergency planning area:

1. revises EOER's Energy Emergency Plan manual annually, which consists of procedures, maps, and contact persons for every major energy company and industry;

2. meets quarterly with four standing committees, composed of representatives of the oil, natural gas, gasoline, and electricity industries;

3. operates an "early warning" data system by which EOER collects energy price, supply and demand data to determine energy availability, to explain the current energy situation, and to forecast future supply scenarios;

4. acts as the lead contact for the state to receive communications from NEPOOL regarding Operating Procedure No. 4, which is used during a regional short-term

shortage of electric power; and

5. represents Massachusetts at U.S. Department of Energy training sessions for coordination during national energy emergencies.

EOER has also worked with the other New England states and with the State of New York to coordinate compatible energy emergency measures. This work is important since much of New England's energy supplies and industries are subject to interstate distribution, and coordination throughout the region would therefore be essential in the event of an energy emergency.

D. LIFE CYCLE COSTING REGULATIONS

Chapter 796 of the Acts of 1979 amended MGL c. 149, section 44M, which now requires that design and engineering contracts for new construction or for the modification of energy systems issued by public awarding authorities in Massachusetts include life cycle cost estimates. EOER is thus mandated to develop and issue life cycle costing regulations, to review all life cycle cost estimates submitted in accordance with these regulations, and to enforce compliance with the law.

Life cycle costs are an important means of ensuring that the energy systems that are installed in new public buildings are both the most energy efficient and the most cost-effective for the long term life of the building. This program is particularly important now, given the upcoming major capital outlays for new public construction in the Commonwealth, most notably at correctional and mental health facilities and at state colleges and universities.

During FY 1988, EOER conducted a review of life cycle cost methodologies and compliance procedures being utilized by other states and the federal government. EOER staff have also met regularly with representatives of DCPO to review the mandated state design review procedures. As a result of these discussions, EOER is in the process of retaining a consultant to develop a computerized life cycle cost methodology, compliance review system and draft regulations.

E. ENERGY PATENT PROGRAM

The statute which created EOER mandated that the Secretary of Energy Resources establish an "Energy Patent Program".

Any Massachusetts resident or Massachusetts corporation who has applied for or who holds a patent for an alternative energy or energy conservation system or device, may petition the Secretary of Energy Resources for determination that such patent is "...of economic value, practicable, and necessary for the convenience and welfare of the Commonwealth." Once the Secretary approves such a patent, any income received from the sale, lease or other transfer of such a patent, including royalty income, and any sale, lease or other transfer of property or materials manufactured in the Commonwealth subject to such a patent, is exempt from the state personal income tax or corporate excise tax. This exemption is valid for five years from the date of issuance of the patent, or approval by the Secretary of Energy Resources, whichever first expires. EOER has promulgated regulations for the Energy Patent Program, which are codified at 850 C.M.R. 6.00.

VII. PHOTOVOLTAIC CENTER

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A. INTRODUCTION

In 1986, the Massachusetts Photovoltaic Center opened with the purpose of encouraging the development and use of photovoltaic (PV) technology, the direct conversion of sunlight into electrical energy. The mandate of the PV Center addresses two of the state's concurrent concerns: 1) the accelerated acquisition of an environmentally benign, economically attractive, energy resource with wide ranging applications in the energy mix of Massachusetts and around the world; and, 2) the development of an "ultra-tech" industry ideally suited to form part of the future industrial base in the Commonwealth.

The Photovoltaic Center was created as a public-private-academic partnership in order to leverage public investment into long range programs that will ultimately benefit the people of Massachusetts.

B. PROGRAMS OF THE MASSACHUSETTS PHOTOVOLTAIC CENTER

Under the Photovoltaic Center's mandate, long range strategies to promote photovoltaics have been developed and implemented. These strategies include: identifying market opportunities to enlarge sales potential for Massachusetts industry; the development of a knowledgeable infrastructure to support PV diffusion around the world; and, analysis of the physical, economic and regulatory environments in which PV must compete with other energy technologies.

The evolution of photovoltaics in the marketplace has been matched by an expansion of programs and services at the Photovoltaic Center. The PV Center's client population includes private industry, government and non-government agencies from developing countries, domestic utilities, state and federal agencies, and financial institutions. The limited resources of the Photovoltaic Center have been leveraged through the public-private-academic partnership, as well as through reciprocation with federal and multilateral agencies such as the U.S. Department of Energy's Sandia National Laboratories, United Nations Institute for Training and Research (UNITAR), and United Nations Development Program (UNDP). The PV Center's ability to serve Massachusetts has improved through its association with other agencies.

The Photovoltaic Center has also achieved observer status on the Committee on Renewable Export Commerce and Trade (CORECT), a multi-agency task force of the federal government that acts to establish national program priorities. This status provides the PV Center with a forum for information exchange, and contacts at the highest levels of government, thereby enabling Massachusetts companies to stay abreast of national and international priorities.

The strength of the PV Center's partnership between government, business and academia is reflected in the four program divisions of the Massachusetts Photovoltaic Center. The Center's programs are outlined on the following pages.

(1) The Demonstration Division

The efforts of this division are directed at developing a knowledgeable infrastructure of decision makers and technicians, capable of choosing photovoltaics for its appropriate uses. The Demonstration Division is the technology information transfer and educational outreach arm of the PV Center, and has developed the following programs:

- International Visitors Program

This program is designed to introduce national and international decision makers to the potential for PV powered applications. Primarily to provide outreach and education, this introduction is in the form of short technical courses held at the PV Center, as well as tours of Massachusetts PV companies and academia. To date, over 4500 international visitors have attended PV Center functions, and 500 foreign decision makers have received technical briefing packages. In addition, 1500 visitors to the United States have toured the Photovoltaic Center.

- Workshops and Seminars

These are designed to educate potential users of PV to its applications, both present and future. The activity is a collaborative effort with business and academia. The format is a 90 minute course covering applications, technology, and economics. A panel discussion follows with the panel members drawn from national organizations, photovoltaic companies, and Massachusetts educational institutions. Cosponsors of the workshops have included: the Kennedy School of Government, the Coolidge Center for Environmental Leadership, and the Massachusetts Photovoltaic Utilization Program. These workshops and seminars are held 8 to 10 times per year, with an average attendance of 20. Attendees have included the Minister of Planning for Costa Rica, and the Senior Technical Advisor to the Inter-American Development Bank.

The PV Center has also been involved in the organizing of technical conferences with other agencies. In this regard, the Photovoltaic Center's role has involved acting as a cosponsor, making presentations, or attending as representatives of the Massachusetts photovoltaic community.

In addition, in July 1988, the PV Center, in conjunction with the United Nations, conducted a training workshop for international decision makers. The workshop's program provided a thorough introductory education for twenty officials from Latin America and the Caribbean Basin. The workshop was sponsored and prepared by a unique collaboration of multilateral development organizations, state and federal government agencies, and photovoltaic companies.

- Information Dissemination Program

This service is designed to generate and respond to inquiries about PV technology. It includes a functional display at Logan Airport's international terminal, and mass mailings to potential users. Additionally, all general correspondence inquiries about the technology and PV Center programs are routed to the International Program Officer at the Photovoltaic Center. To date, over 2000 inquiries for information have been answered. Many of these preliminary inquiries have been requests for product information. These inquiries are passed on to Massachusetts companies as sales leads. Client groups which are actively solicited for sales leads include: U.S. and foreign foundations, foreign government agencies, academic institutions, federal and state agencies, and private voluntary organizations.

The Demonstration Division also actively collects information that will enhance infrastructure or market development. For example, reprints of technical articles and technical documents are collected for dissemination. Under the terms of a cooperative agreement with the U.S. Department of Energy, the PV Center has surveyed the photovoltaic programs of all states. The results of the survey were detailed in a written report, providing a guide to the market, business and program characteristics of individual states.

o PV Center Resource Library

The library provides technical, economic, and marketing assistance to the public, industry, and academia. It does so by making available up-to-date publications. This nonlending library currently holds 600 periodicals and volumes. Included are profiles on PV technology, its applications, foreign trade, and international lending programs. The PV library is utilized on a regular basis, not only by Massachusetts industry and academia, but the general public as well.

(2) The Export Assistance Division

The efforts of this division are directed toward overcoming the barriers of developing a global market for Massachusetts photovoltaics. The Export Assistance Service provides three major services:

- Market Information Service (PV-MIS)

This service provides companies, universities, and organizations with biweekly bulletins of joint research and trade leads from more than 150 industrialized and developing countries. The MIS Bulletins are based on information obtained from computerized databases, newsletters, and direct contact with officials around the world. This information system efficiently gathers, integrates, synthesizes and disseminates PV-specific and PV-potential marketing leads. The service is provided free to Massachusetts companies, other U.S. companies pay a yearly subscription fee. The service is currently in its third year of operation, with more than 70 subscribers from 13 different states. Contractual commitments to the subscribers extend to 1990.

In 1987 and 1988, the service tracked approximately 500 projects worldwide. Of these, 128 were developed for listing in the Bulletin. A majority of these projects were outside the United States, with most of the export opportunities falling in Africa and the Far East. The photovoltaic sales potential represented by the listed projects was approximately $180 million.

- Renewable Energy Data Service

This is an externally financed service performed for Sandia National Laboratories and the United States Export Council on Renewable Energy. This service responds to their joint need to improve national economic competitiveness through information transfer to American industry. It encompasses all renewable energy technologies. Computerized searches provide the latest strategic data on renewable energy technologies gathered from databases located throughout the world. Raw data is provided to the National Laboratory on a biweekly basis so that it can be disseminated to U.S. organizations. An added component to this service is a collaboration with the United Nations Small Energy Center in Rome, Italy to monitor renewable energy projects around the world.

(3) Technology Transfer Service

This is a new component of the Export Assistance Division that will be a revenue generating information service provided for Massport, the Massachusetts Office of

International Trade, the U.S. Department of Commerce, and multilateral donor organizations such as the United Nations. This service is designed to assist Massachusetts state agencies, and others involved in exporting, to take full advantage of the Export Assistance Division's state-of-the-art computer system. Utilizing this system, small, medium, and large industries can receive up-to-the-minute customized searches on topics that will assist them in the export of their products to the international marketplace.

The efforts of this division are directed at expanding the technical knowledge and user experience base for stand alone PV applications. The Photovoltaic Center's Division of Technical Services is located at the University of Lowell. Funding in the amount of one million dollars has been secured from the U.S. Congress for a multi-year program. A cooperative agreement between the U.S. Department of Energy and the Executive Office of Energy Resources, established the University of Lowell Photovoltaic Program as technical support for the Massachusetts Photovoltaic Center. Through this agreement, the PV Center also receives technical support from Sandia National Laboratory, the premier federal laboratory for PV research.

This cooperative agreement outlines the development of technical photovoltaic training courses. The training courses are targeted to international government and business officials who may be interested in purchasing PV systems. The goal is to familiarize participants with the technology, so that they will be comfortable in choosing it as a means of satisfying their energy needs. The training course offers the first opportunity for participants to learn about PV, how it works, and its many applications.

The photovoltaic program's federal funding also supports research and evaluations of photovoltaic systems for use in remote locations. Research is currently underway at the University of Lowell in PV powered water pumping, vaccine refrigeration, crop drying, and battery development. In addition, a simplified method to accurately size PV system components has been developed.

The PV Center's Technology Services Division has recently begun a multi-year monitoring project of EOER's Massachusetts Photovoltaic Utilization Program (MassPUP). Monitoring, as requested by Sandia National Laboratory, includes on-site inspection and evaluation of all projects and systems. This provides important performance information, needed in order to establish product credibility.

(4) Financial Services Division

The efforts of this division are focused on correcting the barriers, real and perceived, that photovoltaics is too costly for general use. From an economic perspective, one of the largest drawbacks to photovoltaics is the initial capital cost. The benefits of photovoltaics include long lifetime, no fuel costs, and minimal maintenance costs. By comparison, the major energy competitors to photovoltaic power exhibit economic characteristics of low initial costs, but significant operating as well as shorter life spans.

There are four major tracks to the financial services provided by the Massachusetts Photovoltaic Center:

- Economic Analysis Service

This service provides project life cycle cost comparisons of photovoltaic power versus fossil fuel sourced power for stand-alone applications. The basic concepts of the analysis process are presented to international as well as to domestic audiences during the PV Center's regularly held seminars. This allows decision makers to recognize situations where the use of photovoltaics is the most cost-effective allocation of resources.

- Financial Analysis Service

The trend by U.S. photovoltaic companies over the past 18 months has been to target utilities for PV projects. The consensus opinion among the photovoltaic community indicates that the utility market will soon be opened to PV, and that it will present unlimited opportunities. In order to support this direction of PV technology, and to accelerate market development, the Photovoltaic Center worked together with the Bank of Boston to develop a tool for analysis of utility scale photovoltaic power production facilities from an investor's standpoint. The Bank's contribution was to provide expert assistance and experience in alternative energy project finance, on a pro bono basis.

o Program Information Service

Many existing photovoltaic companies, as well as newcomers to the business, have few if any staff with experienced financial capabilities. To assist these organizations, as well as the end users of PV technology, the PV Center's program information service was created.

This service provides initial screening of funding institutions and their programs. A computerized database of this information is being developed. It lists institutions and the various programs offered that can be utilized specifically by the photovoltaic industry for their unique funding needs.

The database includes a wide range of organizations from the Export Import Bank and the Overseas Private Investment Corporation, to Massachusetts' own quasi-public industrial finance institutions.

o Educational Outreach

The obstacle to widespread photovoltaic use is lack of knowledge: of the technology, of its capabilities, of its environmental benefits. This barrier exists in lending agencies, where any new technology is viewed with hesitation. The barrier is also prevalent among potential large scale PV users, as well as government entities responsible for energy and environmental issues.

To overcome institutional inertia, an educational outreach campaign encompassing two tracks has been undertaken. One track entails the process of providing information to financial officers at both public and private institutions, as well as potential large scale commercial and industrial users of PV power. The information presented to these clients includes the current rate of photovoltaic technology, its economics, and an assessment of the PV industry and its future prospects.

The basis for the other track lies in the inequalities of current methods of cost comparison used by regulatory bodies. External costs of conventional energy production, such as pollution and risk, have negative value, but are not considered in cost analysis. The Photovoltaic Center recently completed a study outlining the various social costs and environmental impacts of conventional electric power production. The study revealed that the strict economic comparison between PV and other energy sources currently used is invalid.

The goal of PV Center's educational effort is to promote an equal comparison of various forms of energy production. Working with EOER's Policy Unit, the PV Center strives to inform state government officials that energy choices have potentially long-term impacts on society and the environment, as well as on the economy.

VIII. ENERGY FACILITIES SITING COUNCIL

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A. OVERVIEW

In accordance with G.L. 164, secs. 69G - 69S, the Energy Facilities Siting Council (EFSC) is charged with the responsibility of ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. The EFSC fulfills its important statutory mandate through the performance of the following functions:

(1) Adjudicating proposals to site jurisdictional power plants, electric transmission lines and intrastate gas pipelines;

(2) Representing the environmental interests of the Commonwealth in Federal Energy Regulatory Commission (FERC) interstate gas pipeline siting proceedings;

(3) Adjudicating annual forecasts and supply plans of the Commonwealth's electric and gas utility companies; and

(4) Coordinating the licensing of hydropower facilities in Massachusetts.

The EFSC consists of ten members: the Secretary of Energy Resources (the Chair), the Secretary of Consumer Affairs and Business Regulation, the Secretary of Economic Affairs, the Secretary of Environmental Affairs, and six public members (representing engineering, environment, labor, electricity, gas, and oil). All of these members are appointed by the

Governor. The EFSC has an executive director and additional staff consisting of lawyers, engineers, planners, economists and environmentalists.

Since its establishment in 1974, the EFSC has played a vital role in the Commonwealth as the only agency which is responsible for determining the often delicate balance between the need for new energy resources, state and regional environmental concerns, and the interests of utility ratepayers. In fact, the EFSC's statute's designation of the EFSC as the only state agency which is responsible for achieving this balance is underscored by G.L. c. 164, sec. 69K, which authorizes the EFSC to override any state or local agency that prevents or delays the construction of a facility proposal approved by the Siting Council.

In recent years, the EFSC has been a key agency in addressing the serious energy resource questions facing the Commonwealth. In this regard, the EFSC has worked with EOER in promoting conservation and load management, advocating the introduction of new natural gas supplies for the region, and increasing the role of cogenerators and small power producers in the Commonwealth's power marketplace. This section of this paper will proceed to outline the EFSC's recent accomplishments, as well as some of the important challenges facing the EFSC in the coming months.

B. ADJUDICATING FACILITY PROPOSALS

As the demand for energy grows in the state and in the region, the number of proposals filed with the EFSC for new power plants, transmission lines, and gas pipelines is also increasing. For example, the Siting Council recently has reviewed and approved two proposals to construct large power plants in the state. These two plants, which are slated for Pittsfield and Bellingham, were the first such plants proposed to be built in Massachusetts within the last decade. In reviewing these proposals, the EFSC determined that these plants would provide much needed power at low cost, with minimal environmental impact.

The Siting Council's decisions in the Pittsfield and Bellingham matters are particularly significant as they represent the first two large cogeneration plants initiated in the state by non-utility developers. These types of facilities ensure a reliable and economic power supply for the Commonwealth and have been strongly encouraged by EOER. In both the Pittsfield and Bellingham cases, the EFSC's comprehensive review process (including facility site visits, public hearings, discovery, and evidentiary hearings) was completed in approximately six months, an unprecedented time frame for a process which included full review of critical need, cost and environmental issues.

Over the last year, the EFSC also has reviewed and approved four transmission line proposals and one intrastate gas pipeline proposal. Four of these lines (in Braintree, Middleborough, Hingham, and the Lower Cape) will allow companies to more reliably serve their customers, while a transmission line in Turners Falls will allow the non-utility developer of a 20 megawatt cogeneration facility to interconnect with the regional transmission grid. In each of these cases, the EFSC balanced need, cost and environmental impacts of the new facilities. In fact, the environmental impacts of the utility's preferred route in the Lower Cape transmission line case prompted the EFSC to approve an alternate route that was more environmentally acceptable.

The increased demand for energy certainly is reflected in the number of facility applications that the EFSC will be required to review in the coming months. Currently, there are four facility proposals before the EFSC, and at least one dozen additional proposals are expected to be filed in the next year.

The four pending facility cases include a Boston Edison Company proposal to construct an underwater transmission line from its New Boston Station in South Boston to the MWRA facility on Deer Island; a proposal by New England Power to construct a three-mile transmission line connecting a 40 MW cogeneration facility in Pepperell to the transmission grid; a proposal by the Berkshire Gas Company to build an 11-mile gas pipeline to serve the approved cogeneration facility in Pittsfield; and a proposal by the Bay State Gas Company to construct a 19-mile gas pipeline to MMWEC's Stony Brook facility in Ludlow.

As previously mentioned, at least one dozen other facility proposals are expected to be filed within the next year. These proposals, comprising power plants, transmission lines and gas pipelines, could involve the following municipalities: Springfield, Everett, Ayer, Lynn (two projects), North Attleborough, North Dartmouth, Middleborough and Taunton.

C. INTERSTATE GAS PIPELINE PROCEEDINGS

In its role as an intervenor in FERC proceedings regarding proposals to construct interstate gas pipelines in Massachusetts, the EFSC is the only state agency that actively represents the Commonwealth's environmental interests. Over the years, the EFSC has been successful in advocating pipeline route changes and the introduction of mitigation measures designed to minimize environmental impacts.

The Siting Council fulfills its role through a comprehensive process of site visits and hearings designed (1) to involve and update the municipalities most affected by the pipeline proposals, and (2) to compile critical information on environmental issues for filing with FERC. Over the last eighteen months, the EFSC participated in FERC matters involving proposed pipeline construction in Braintree, Randolph, Medway, Hopkinton, Holliston, Westwood, Seekonk, Plymouth, Waltham, Burlington, Oxford, Sutton, Bolton, Lancaster, Leominster, Lunenberg, Southampton, Easthampton, Northampton, Pittsfield, Southwick, Agawam, East Longmeadow, Hampden, Wilmington, Peabody and Danvers.

The EFSC's role as an intervenor in FERC proceedings will increase dramatically this year as a result of FERC's "Open Season" proceedings. Through its "Open Season" proceedings, FERC will determine which natural gas pipeline companies will bring new gas supplies to New England and where those facilities will be constructed. In Massachusetts, applications filed in the "Open Season" process include construction of over 200 miles of new natural gas pipeline in 60 communities. In 1989, the EFSC plans to make site visits to every community impacted by proposals, conduct between ten and twenty public hearings, and file environmental comments on all "Open Season" applications.

D. ADJUDICATING UTILITY FORECASTS AND SUPPLY PLANS

The nine electric utilities and 14 gas companies operating in the Commonwealth each are required to file annual forecasts and supply plans with the Siting Council. Electric companies file 10-year forecasts and supply plans, while gas companies submit forecasts and supply plans covering five years.

The Siting Council's review of forecasts and supply plans is critical because a utility is prohibited by statute from commencing construction of a jurisdictional power plant, transmission line or gas pipeline, if its most recent forecast or supply plan has been rejected. This statutory linkage between facility construction and approved forecasts operates to ensure that major energy facilities are undertaken in the Commonwealth only when they are the result of an accurate and comprehensive least-cost planning process.

E. COORDINATING HYDROPOWER LICENSING

Pursuant to G.L. c. 164, sec 69H1/2, the EFSC is responsible for coordinating the state and local permitting of hydroelectric power facilities in Massachusetts. In fulfilling this role, the EFSC provides information to entities interested in developing projects in the Commonwealth, conducts meetings between applicants and permitting agencies, sets schedules to ensure timely permitting of all projects, and generally acts to facilitate a comprehensive and workable licensing process. The EFSC also assists hydropower operators and residents in resolving issues concerning already licensed hydropower facilities.

In the last six years, the EFSC has coordinated the permitting of over thirty hydroelectric facilities. The Siting Council expects to coordinate the processing of at least two facilities in the coming year.

IX. LEGISLATIVE INITIATIVES

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A. LEGISLATIVE ACCOMPLISHMENTS

The past six years have seen a number of new state laws enacted which EOER has actively supported:

1983 Legislative Accomplishments

1. The Extension of the Solar Tax Credit (Ch. 518)

This Act extended for two years (to December 31, 1985) the expiration date of the Massachusetts income tax credit for renewable energy systems, and made the credit available to tenants as well as homeowners. Chapter 518 also extended for two years the sales tax exemption for wood-fired heating units costing more than $900.

2. The $25 Million Energy Bond (Ch. 700)

This Act provided an additional $25 million for energy conservation projects in public buildings. Of the total amount, $12 million was allocated for projects in state buildings, $8 million was allocated for projects in buildings owned by cities, towns and regional school districts, and $5 million was allocated for alternative energy projects in public buildings, both state and local.

A number of other bills of significance to EOER were also passed in 1983:

Chapter 515: provided financial assistance to school systems for a number of projects, including those designed to make a school building more energy efficient.

Chapter 560: authorized the Massachusetts Industrial Finance Agency (MIFA) to issue tax exempt bonds to finance energy conservation projects in nursing homes and convalescent homes.

Chapter 574: provided the Executive Office of Communities and Development with $196.6 million for public housing; $20 million of that amount must be used for energy conservation and cost-saving energy improvements at existing public housing projects.

The Capital Outlay Budget: contained a number of energy-related items, including:

- $1.5 million for energy conservation in the buildings in Government Center;
- $1.15 million for heating and ventilation system improvements in correctional facilities;
- $3.6 million for utility and energy conservation repairs and renovations at state schools for the mentally retarded;
- Over $11 million for utility and energy projects at various state schools of higher education; and
- $2.5 million for improvements at DPH's Western Massachusetts Hospital.

1984 Legislative Accomplishments

Chapter 52: enhanced the ability of local governments to enter into contracts for energy management services. The new law gave local governments the authority to enter into multi-year contracts for energy management services, and stated that energy management projects implemented under this authority would not add to nor be prevented by a local government's present debt. Localities that had reached their debt limit would have a means of financing energy conservation.

Chapter 234: Section 14 of this chapter (the FY 1985 Budget) enabled EOER to develop and implement the commercial and Apartment Conservation Service (CACS) Program.

Chapter 320: enabled communities which have municipal light departments to contract with other public or private power suppliers for the purchase, sale, or maintenance of equipment, supplies and materials. This new law also allowed the municipals to jointly buy and store equipment and to jointly purchase conservation and load management devices.

Chapter 348: reestablished a state Board of Building Regulations and Standards (BBRS) under the Executive Office of Public Safety. The absence of such a board had hindered EOER's attempts to update the energy-related portions of the State Building Code.

Chapter 466: made EOER's Photovoltaic Center one of the Commonwealth's "Centers of Excellence".

1985 Legislative Accomplishments

Chapter 140, Section 35: an outside section of the budget (inserted at EOER's request) permitted the state, counties, cities and towns to enter into contracts for energy management services in public buildings.

Chapter 370: filed as part of EOER's 1985 Legislative

Package, this law enabled the Massachusetts Industrial Finance Agency to provide tax exempt bond financing for cogeneration and small power production projects for commercial and industrial enterprises.

Chapter 595: encouraged the development of hydropower resources in the Commonwealth by providing for a streamlined and coordinated process for the licensing and permitting of hydropower facilities. The original bill was filed by EOER, and required the Energy Facilities Siting Council (EFSC) to promulgate rules and regulations that would simplify the requirement of the various state and local agencies involved in the licensing process.

Chapter 637: provided for the issuance by local cities and towns of "solar energy building permits" which will protect access to the sun for residents who install solar energy units.

Chapter 708: extended for two years the Commonwealth's tax credit for renewable energy. The Commonwealth provides an income tax credit for individuals who install renewable energy systems on their primary residences (solar and wind powered, but primarily solar.) The credit is for 35% of the net cost of the system, up to a maximum credit of $1,000. The credit had been due to expire on December 31, 1985, but was extended to December 31, 1987.

In addition to EOER-sponsored legislation, a number of other energy-related bills were signed into law in 1985:

Chapter 135 authorized the town of Easthampton to build a hydroelectric facility. This project is partially funded by EOER's AEPP.

Chapter 234 authorized municipal light companies to purchase oil and other fuel supplies without bids.

Chapter 590 placed controls on acid rain and acid deposition. The new law prohibited any increase in sulfur dioxide emissions in Massachusetts. The law also required that, should national acid rain legislation not pass by 1987, Massachusetts must begin a program designed to reduce its emissions by 27%.

Chapter 625 prohibited the sale or use of any unvented liquid fired space heater in the Commonwealth. This law was primarily aimed at kerosene heaters, which some fire officials consider dangerous.

Chapter 686 required that all gas appliances sold in the Commonwealth and manufactured after June, 1988, be equipped with an intermittent ignition device which is activated only at the time the gas appliance is turned on. Appliances affected include furnaces, air conditioners, space heaters, refrigerators, stoves, dishwashers, clothes dryers, clothes washers, or other such devices which use gaseous fuel other than propane.

1986 Legislative Accomplishments

Chapter 466: amends Chapter 164, Section 69I of the General Laws. That Section requires the electric and gas utilities of the Commonwealth to file with the Energy Facilities Siting Council an annual forecast of the energy needs of their service area, and their plans to meet those needs. The amendment requires the utilities to include in those annual forecasts a description of the actions which they plan to take concerning the use of energy conservation, load management, and renewable energy resources.

Chapter 489: the Appliance Efficiency Standards Act, is probably the most significant piece of energy legislation enacted in Massachusetts in the past four years. The new law was cosponsored by a bipartisan group of forty legislators from across the Commonwealth and by the Executive Office of Energy Resources, and attracted strong support from a remarkably broad-based coalition. In addition to such consumer and environmental groups as the Massachusetts Audubon Society, the Sierra Club, MassPIRG and the League of Women Voters, the bill was actively supported by Commonwealth Gas Company, the Better Home Heating Council, the New England Fuel Institute, the Massachusetts Municipal Wholesale Electric Company, the Massachusetts Electic Company, and the Boston Edison Company.

Beginning on January 1, 1988, the bill set minimum energy efficiency standards for a number of residential and small commercial appliances. Appliances covered by the legislation include refrigerators, freezers, water heaters, and fluorescent ballasts. It is estimated that the net economic benefit for the citizens of the Commonwealth from 1988 to 2000 due to decreased energy bills, will exceed one billion dollars. In addition, the legislation will defer the need by the state'e electric utilities to add between 200 to 300 megawatts of new generation capacity.

1987 Legislative Accomplishments

Chapter 670: authorized an additional fifteen million dollar capital outlay for EOER's energy bond programs for cities, towns, counties, regional school districts, and regional sewer districts.

Chapter 677: extended the states's personal income tax credit for individuals who install renewable energy (solar and wind) systems in their homes. The credit was extended at 35% of the net cost of the system (up to $1,000) until December 31, 1988. At that time, the credit dropped to 25%, and it will be reduced to 15% effective January 1, 1991.

1988 Legislative Accomplishments

Chapter 95: expanded coverage of the Appliance Efficiency Standards Act to include incandescent, reflector incandescent, tungsten halogen and fluorescent type lamps. Effective January 1, 1990, such lamps shall not be installed in the Commonwealth in a building other than a residence unless the lamp meets or exceeds the standards to be established by the Secretary (of EOER) for that lamp type.

Chapter 129: authorized the Massachusetts Municipal Wholesale Electric Company to participate in a variety of energy conservation, load management, cogeneration, and renewable energy programs.

Chapter 156: exempts "shop lights" from the standards established by the Appliance Efficiency Standards Act. Shop lights are typically installed in basements, garages, and laundry rooms, and generally replace incandescent lighting with more efficient fluorescent lighting.

B. 1989 LEGISLATIVE AGENDA

For 1989, EOER has filed a legislative package of eight bills, each of which is designed to advance the agency's mission and goals. A summary of those bills follows:

EOER Legislative Package for 1989

The Executive Office of Energy Resources has filed a legislative package that includes eight bills to be considered in the 1989 session of the State Legislature. The bills are:

H.119 AN ACT PROVIDING FOR A CAPITAL OUTLAY FOR ENERGY CONSERVATION IN PUBLIC BUILDINGS

This bill would provide an additional $25 million for EOER's Energy Audit and Energy Conservation Improvement Programs. These programs provide funding for energy audits and energy conservation measures in public buildings which are owned by cities, towns, counties, regional school districts, and other public entities. The programs were created by the legislature in 1979 with an initial bond authorization of $15 million, and were augmented by an additional $8 million in 1983, and an additional $15 million in

1987. From the inception of the program through October 1988, 1,700 buildings in 328 cities, towns, and regional school districts had received funding for energy audits and energy conservation improvements from EOER. The estimated annual savings from these grants exceed $10 million.

The bill also requires that grant recipients repay 30% of the grant award to the Commonwealth within ten years of receiving the grant. This repayment is only a fraction of the energy savings which the grant recipient will realize from the energy improvements.

H.120 AN ACT ESTABLISHING A COORDINATED LICENSING PROGRAM FOR SMALL POWER PRODUCTION FACILITIES

This proposed legislation establishes procedures to allow small power production facilities (those facilities which generate electric power and have a total installed capacity of less than 100 megawatts) to take advantage of a new streamlined licensing/permitting process coordinated by the Energy Facilities Siting Council.

The legislation is, in part, modeled after M.G.L. c. 164, s. 69H 1/2, the Siting Council's successful low-head hydroelectric power coordinated licensing act. The hydro power program gives the Council the role of coordinating the separate licensing processes of numerous other individual agencies while preserving actual permit granting authority in each agency. The Council is proposing expansion of this type of program to other forms of small power production to help encourage the development of worthy projects which can help Massachusetts meet its energy needs in an economic, environmentally responsible and expeditious manner.

H.121 AN ACT PROVIDING FOR AN EXEMPTION OF CERTAIN COGENERATORS AND SMALL POWER PRODUCERS FROM CERTAIN DEPARTMENT OF PUBLIC UTILITIES REGULATIONS

This bill would amend Chapter 164 of the General Laws by removing most of the jurisdiction of the Department of Public Utilities (DPU) over "alternative energy producers." These facilities are defined as a "cogeneration facility" (i.e., a facility that produces both electrical and thermal energy) and a "small power production facility" (i.e., a facility that uses a renewable energy source to produce gas or electricity.)

This bill would also allow alternative energy producers to make limited retail electricity sales (of ten megawatts or less) without subjecting them to full DPU regulation as an "electric company" and the accompanying regulatory requirements under Chapter 164.

Under the new legislation, while alternative energy producers would be exempt from most DPU jurisdiction, they would not be exempt from the provisions of Chapter 164 that prohibit shutting off or failing to restore electric service to residences under certain conditions (such as when a household member is experiencing a serious illness, during financial hardship, or where an infant or elderly person resides.)

H.122 AN ACT TO ESTABLISH A PROGRAM TO PROMOTE PHOTOVOLTAIC ENERGY IN THE COMMONWEALTH

This bill adds a new section to Chapter 25A of the General Laws, which provides the statutory authorization for the Commonwealth's Executive Office of Energy Resources. The new section gives explicit authority to the Secretary of Energy Resources to establish a program to promote photovoltaic energy in the Commonwealth, including the Massachusetts Photovoltaic Center.

The new legislation will permit EOER to promulgate rules and regulations for its PV Program, and will enable EOER to:

- Limit some services of the PV Center to Massachusetts-based companies and institutions;

- Provide for "membership' or "subscription" fees to be paid by participating businesses, which will be used to offset the Commonwealth's costs of operating the Center;

- Limit distribution of valuable international market information to participating companies or institutions; (without such authorization, this information might have to be given to any company that requested it under the state's Freedom of Information law.)

H.123 AN ACT TO ENCOURAGE THE DEVELOPMENT OF PHOTOVOLTAIC ENERGY RESOURCES IN THE COMMONWEALTH

This bill would provide a new tax incentive that would make Massachusetts more competitive with other states that are attempting to attract investment in photovoltaic energy technology.

The bill would create a new 25% tax credit for corporations which install photovoltaic generating facilities. This credit is the equivalent of that offered by the State of California, which has been extremely successful in encouraging photovoltaic development. Such a credit is a necessary prerequisite to the creation of any photovoltaic central generating system in Massachusetts.

H.124 AN ACT RELATIVE TO CONTRACTS FOR ENERGY MANAGEMENT SERVICES

The purpose of this bill is to clarify the state's competitive bidding laws as they relate to contracts by public agencies for energy management services.

The public buildings of the Commonwealth consume tremendous amounts of energy for heating, lighting, ventilation, and air conditioning. Dollars that are spent on wasted energy for these buildings could be put to far better uses if public agencies -- cities, towns, counties, public authorities and the Commonwealth itself -- were encouraged to perform energy audits, install appropriate energy conservation measures, and insitute sound ongoing energy conservation practices. This legislation provides a clarification of the state's competitive bidding laws that will enable public agencies to take these energy saving steps at no up-front capital cost to the public agency. At the same time, the legislation recognizes the intent of the bidding laws by providing for a completely open and competitive process for selecting contractors.

H.125 AN ACT TO AUTHORIZE THE GOVERNOR TO RESPOND TO ENERGY SUPPLY DISRUPTIONS

This bill makes clarifying amendments to EOER's statute to ensure that the Governor will have adequate statutory authority to respond to an energy emergency in the Commonwealth resulting from a disruption in energy or fuel supplies.

H.126 AN ACT CLARIFYING THE JURISDICTION OF THE ENERGY FACILITIES SITING COUNCIL

This bill makes a clarifying amendment to Chapter 164 of the General Laws. As that statute is currently drafted, a developer of a major energy facility who was not a "corporation" (for example, a partnership or an individual) could avoid the jurisdiction of the Energy Facilities Siting Council by employing a strict reading of the law.

EOER believes that the original intent of the Siting Council statute was to provide oversight over all major energy facilities, but that a technical "loophole" exists which could thwart the Legislature's intent in creating the Siting Council. EOER believes that the Legislature intended for all major energy facilities to receive Siting Council approval, regardless of the type of business entity proposing them.

X. EOER MANAGEMENT

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A. FISCAL MANAGEMENT

The number and types of funding sources used by EOER, relative to the size of the office, are greater than those of most state agencies. EOER currently receives funding from the state in the form of both general and capital appropriations, from the federal Department of Energy, as well as from eleven different oil overcharge settlements.

In addition, EOER utilizes an expendable trust account within the Energy Facilities Siting Council, and sets its own fees to offset expenditures of its utility-regulated programs. EOER revenues include principal and interest payments from city and town grantees receiving funding under EOER operated bond programs, subscription fees from the Photovoltaic Center's PV-MIS Bulletin which biweekly lists available PV projects, and fees from utility companies and businesses participating in the Energy Advisor Service.

Over the last several years, the sources of EOER's funds have changed substantially. EOER's reliance on federal funds has been decreased significantly due to federal cutbacks.

Yet the major change in EOER's funding has been the dramatic increase in the number of oil overcharge settlements which the Commonwealth has received. Since FY 1987, Massachusetts has received more than $100 million in oil overcharge settlements. These funds have been used under one of the five existing federal Department of Energy programs --

the State Energy Conservation Plan, Energy Extension Service, Institutional Conservation Program, Low Income Weatherization Program and Fuel Assistance. EOER has allocated other smaller settlements to transportation-related conservation projects, depending on the restitutionary nature of the settlement.

The largest of the recent settlements was $70.3 million which was received from the Exxon Corporation. Governor Dukakis allocated the majority of these funds to the Commonwealth's low income weatherization program, (administered by the Executive Office of Communities and Development) and assigned the remaining to EOER to establish the HEAT program for moderate-income families and to support the Energy Advisor Service for the commercial/industrial sector. Additional funds from the Stripper Well settlement have been allocated to EOCD programs, to extend the HEAT program, and for an energy efficiency program for nonprofit organizations.

Since 1983, many aspects of the fiscal administration of EOER have changed significantly. Virtually every procedure has been revised and improved upon in some way. In addition, many new procedures have been developed to facilitate the proper and efficient handling of all funds received by EOER, and to assure the smooth operation of the office.

EOER has ably managed its general appropriations and has never requested a deficiency budget. Over the last two years, EOER has been audited on five different occasions by the Office of the State Auditor, federal agencies, and the State Single Auditors which resulted in EOER being cited as one of the most efficiently run agencies in state government.

Over the past six years EOER has made substantial progress in the management of its bond funds; specifically, monitoring grant activities, the collection of interest income, and self-evaluation of its fiscal programs.

Over the last six years, a system has been initiated whereby at least three site visits are performed at each of the grantee locations receiving funds from EOER's bond programs. One hundred percent of the grantees receive site visits. EOER also worked diligently to assure that outstanding interest was returned on all funds, resulting in delinquent interest income having been collected in virtually every case. In addition, EOER developed and implemented a standardized self-evaluation system based upon grantee energy reports. EOER's bond programs' current operation can be positively compared to the operation of any other state bond program.

B. PERSONNEL/ADMINISTRATION MANAGEMENT

EOER has also made substantial progress over the last six years in the operations area by implementing many management improvements. EOER has continued to work to efficiently administer the compensation, benefits, labor relations, staff development, classification, performance evaluation, recruitment and office management systems within the Secretariat. In addition, the agency has made several positive changes in its human resource management beyond those that have been the result of major state initiatives such as the Personnel Management Information System (P.M.I.S.).

For instance, in 1983, EOER instituted an internal management by objective, "MBO" planning process. EOER's "Workplan" system has enabled the managers to prioritize, plan, monitor and evaluate agency projects more effectively. This system made EOER's transition to the Commonwealth's Performance Management System (PMS) in 1986 and the Employee Performance Review System (EPRS) in 1987 exceptionally smooth.

Absenteeism was another area of focus for EOER. While sick leave utilization has recently received great attention from both the Administration and the Legislature, EOER began an internal monitoring and reporting process in 1983 which has produced dramatic results. The Secretariat's annual sick leave average which was 13.74 in FY 1983 fell to 5.3 in FY 1988.

Efficiency of operations and staff productivity are greatly influenced by clear communications. In order to enhance the understanding of agency procedures and to clarify agency application of the Commonwealth's personnel policies, in 1988, EOER developed and issued to all employees a comprehensive Administrative Manual.

EOER has also successfully worked to convert all of its (03) contracted employees to state positions -- reducing the number from fifty percent of total staff in 1983 to close to zero percent at present.

Finally, in 1986, EOER developed and implemented a comprehensive management training program available to all agency staff. This program resulted in greater professional development for all employees and improved agency productivity, communication and morale.

Supporting all of the advances in agency operations over the last six years has been the acquisition and installation of an agency wide computer system. In 1983, EOER had only meager data-processing capabilities. Starting in 1984, EOER and the Energy Facilities Siting Council began the process of purchasing an upgraded computer system for the agency and automating all of the agency's operations. The availability of the computer's capabilities and the subsequent expansion of the agency's system has enabled EOER to use its time and analytic resources more efficiently.

C. EXECUTIVE OFFICE OF ENERGY RESOURCES FY 1989-- FUNDING SOURCES

State Appropriations

9300-0003	Office of the Secretary	$1,650,000
9300-0500	Energy Facilities Siting	525,000
9300-0600	Residential Conservation	176,921
9300-0800	Photovoltaic Center	340,953
		$2,692,874

Expendable Trusts

9300-6051	Energy Facilities Siting	$ 21,126

Federal Funds

9300-9642	Institutional Conservation	$ 47,896
	Program Funds	957,927
9300-9741	Energy Extension Service	81,000
9300-9742	State Energy Conservation	189,000
9300-9764	Photovoltaic Program	586,000
9300-9755	HUD Solar Bank	81,000
9300-9757	Biomass	30,000
		$1,972,823

Oil-Overcharge Funds

9300-7011	Northeast	$ 265,856
9300-7013	Amoco	45,306
9300-7014	Exxon	29,628,163
9300-7015	Diamond Shamrock	1,474,605
9300-7016	Stripper Well	27,262,689
9300-7019	Warner	1,364,529
9300-7020	Mass/Gas	593,286
		$60,634,434

Bond Authorizations

9300-3901	Energy Audit Program	$ 789,530
9300-3902	Alternative Energy	1,140,055
9300-3906	Alternative Energy II	5,000,000
9300-3908	State Facilities	2,713,418
9300-3909	Energy Conservation	15,000,000
		$24,643,003

XI. APPENDIX A

XI. APPENDIX A

SURVEY OF STATE ENERGY OFFICES

A survey of 33% of the 56 state, territory and District Energy offices was conducted as part of this report to the Governor. The following is a synopsis of the information which was collected.

STATE	# OF EMPLOYEES	TOTAL BUDGET	STATE $'s
Massachusetts	77.3	$ 2,850,000 2 $ 19,800,000 1	$ 1,900,000
THE NORTHEAST			
Connecticut	40	$ 1,767,100 2	$ 1,101,000
Maine	24	no response	$ 693,000
Washington,D.C.	67	$ 10,500,000 1	$ 3,500,000
New York	260	$ 28,000,000 1	$ 4,200,000
THE WEST			
Oregon	85-90	$ 25,168,804 1	$ 9,800,000
Washington	120	$ 30,000,000 1	$ 2,000,000
Utah	25	$ 11,500,000 1	$ 350,000
Colorado	23	$ 1,300,000 1	-0-
Arizona	38	$ 1,702,810 1	$ 379,000
California	400	$150,000,000 1	$ 50,000,000
MID-WEST			
Missouri	54.5	no response	$ 363,400
Illinois	80-90	$ 5,439,600 1	$ 224,400
Pennsylvania	50	$ 10,500,000 1	$ 2,573,000

SOUTH

Tennessee	18	$ 21,000,000[1]	$ 600,000
Georgia	17	$ 47,000,000[1]	$ 340,000
Florida	25	$ 63,100,000[1]	$ 279,000
Arkansas	22	$ 901,952[2]	$ 656,482

1- Includes the expenditure of Petroleum Violation Escrow Funds that were assigned to the energy agency by the appropriate Governor.

2- Does not include Petroleum Violation Escrow Funds

3- Pending before the Pennsylvania Legislature is an effort to greatly expand the duties of the energy office, as well as to elevate it to cabinet status. So both the budget and staff numbers may change significantly.

4- California's state dollar number includes assessments which are placed directly on the ratepayers.

5- In addition to the state dollar number, this includes some utility assessments, fees, siting fees, and funds for emergency nuclear response planning.

6- The State of New York's employee and dollar numbers do not include 80 employees or $11,500,000 in state money for an agency of the New York Energy Office called the New York State Energy Research and Development Agency (NYSERDA). The Commissioner of the Energy Office acts as Chairman of NYSERDA, in a similiar way to the Massachusetts Secretary of Energy acting as Chair of the Energy Facilities Siting Council.

XII. APPENDIX B

EOER PROGRAM/FUNCTION	$ (See note)	FUNDING SOURCE	TARGET AUDIENCE
1. State Annual Forecast of Energy Resources (p. 13)	*	State	State policy makers, regulators, utilities, business community, consumers.
2. Interventions (p. 14)	*	Oil overcharge	State policy makers, regulators, utilities.
3. Cogeneration & small power technical assistance (p. 17)	*	State	State policy makers, cogen. & small power developers, state regulatory agencies.
4. Energy building code (p. 18)	*	Oil overcharge	State policy makers, building inspectors, design & construction industry.
5. Environmental policy coord. (p. 19)	*	Oil overcharge	State policy makers, regulatory agencies.
6. Appliance efficiency standards (p. 19)	*	State	Manufacturers, sellers, consumers of electrical appliances.
7. MMWEC technical assistance (p. 21)	*	Oil overcharge	Member communities of MMWEC.
8. Energy supply data collection (p. 22)	*	Federal	Utilities, oil companies, media, state policy makers, general public.
9. Oil & Gas policy development (p. 25)	*	State	Federal & state policy makers, oil companies, gas utilities, federal & state regulations.
10. Demand-side management advocacy (p. 26)	*	State & Oil overcharge	State policy makers, state regulators, electric utilities.
11. Nuclear policy development (p. 28)	*	State	Federal & state policy makers & regulators, electric utilities, general public.

EOER PROGRAM/FUNCTION	$ (See note)	FUNDING SOURCE	TARGET AUDIENCE
12. State Energy Cons. Prog. (SECP) (p. 29)	$20,000.	Federal	State policy makers, general public.
13. Institutional Cons. Program (ICP) (p. 31)	$ 1 M +	Federal	Public & private nonprofit schools & hospitals.
14. Energy Extension Service (EES) (p. 32)	$85,000.	Federal	General public.
15. Oil Overcharge Program (p. 34)	$ 7 M +	Oil overcharge	Consumers of transportation fuels, state transportation policy makers.
16. Energy Cons. Service (ECS)[also Residential Conserv. Service - (RCS)] (p. 36)	$182,000	Utility assessment	Residential energy consumers.
17. Commercial Conservation Service (CCS) (p. 41)	$100,000	State (proposed for utility assessment)	Commercial sector energy consumers.
18. Shared savings program (p. 42)	*	Oil overcharge	State & local policy makers, & public building owners/ managers.
19. Energy Audit Program (EAP) (p. 43)	$ 3 M +	Bond & state	Buildings owned by state, cities, towns, counties, other public agencies.
20. Energy Consv. Improv. Prog. (ECIP) (p. 43)	$ 23 M +	Bond & state	Buildings owned by state, cities, towns, counties, other public agencies.
21. Alternative Energy Prop. Prog. (AEPP) (p. 46)	$ 10 M +	Bond & state	Buildings owned by state, cities, towns, counties, other public agencies.
22. Home Energy Assistance Team (HEAT) (p. 50)	$ 31 M +	Oil overcharge	Residential energy consumers.

EOER PROGRAM/FUNCTION	$ (See note)	FUNDING SOURCE	TARGET AUDIENCE
23. Nonprofit Energy Effic. Prog. (NEEP) (p. 51)	$ 5 M	Oil overcharge	Nonprofit agencies.
24. Energy Advisor Service (EAS) (p. 53)	$ 3 M +	Oil overcharge	Small-medium size commercial energy consumers.
25. State Facilities Cogen. Proj. (p. 56)	$90,000 +	State & Oil overcharge	State policy makers & public building owners/managers.
26. Regional/National/ International Liaison (p. 59)	*	State	State, regional, national, & international policy makers.
27. State Agency Liaison/ Coordination (p. 66)	*	State	Policy makers in other state cabinet secretariats & agencies.
28. Energy Education (p. 69)	*	Federal	General public.
29. Energy emergency planning (p. 70)	*	State	State policy makers, oil companies, utilities, media, general public.
30. Life Cycle Costing Regulations (p. 72)	$50,000 +	State & Oil overcharge	Public building authorities, builders, designers.
31. Energy Patent Program (p. 73)	*	State	Alternative energy companies, inventors.
32. Photovoltaic Center (p. 75)	$600,000	State & Federal	Federal & state policy makers, utilities, photovoltaic companies, potential international clients.
(A) Demonstration Division (p. 77)			State, national, international decision makers, technicians.
(B) Export Assistance Division (p. 80)			PV companies, academic institutions.
(C) Technology Transfer Service (p. 81)			Potential purchasers of PV's.

EOER PROGRAM/FUNCTION	$ (See note)	FUNDING SOURCE	TARGET AUDIENCE
(D) Financial Services Division (p. 83)			PV companies, public & private lending institutions, state policy makers.
33. Energy Facilities Siting Council (p. 87)	$721,000	Utility assessment	Elec. & Gas utilities, Cogen./ sml. power, & independent power producers.
(A) Adjudicating Facility Proposals (p. 88)			Gas & electric utilities, independendent power producers, residents of affected communities, energy consumers.
(B) Interstate Gas Pipeline Intervention (p. 91)			Federal & state regulatory agencies, gas companies & gas consumers, residents of affected communities.
(C) Adjudicating Utility Forecasts & Supply Plans			Gas & electric utilities, energy consumers.
(D) Coordinating Hydropower Licensing			Federal & state regulators, hydro developers, residents in affected communities.
34. Legislative Advocacy (p. 94)	*	State	Congress & state legislature, energy producers & consumers.

* **NOTE:** All figures used in the "$" column are approximate; use of an asterisk (*) indicates that the cost of the program or function cannot be readily isolated since numerous staff are involved in parts of the program or function, and the time invested by each may vary.

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